THE MONTHLY

Review

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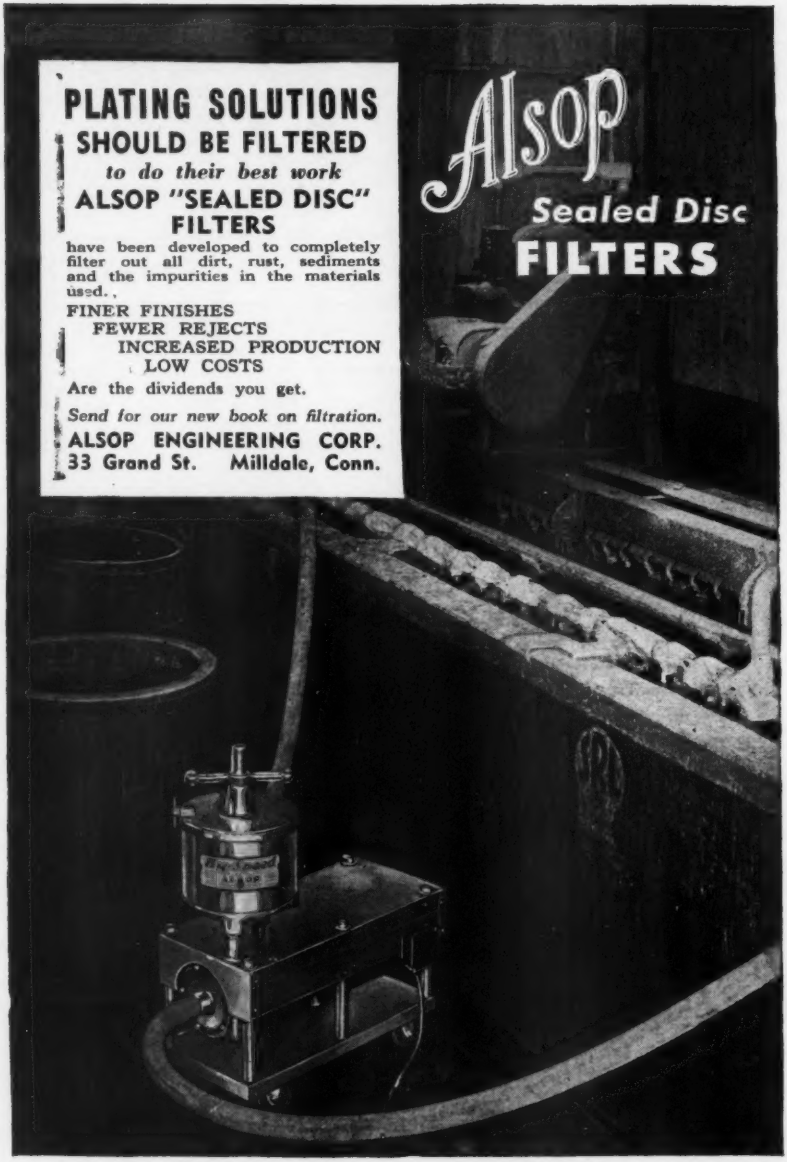
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Yesterday—Today—Tomorrow

This is the first of a series of articles written to acquaint the members with various phases of the operation of their society.

THERE will be one or more amendments offered to the Constitution at this year's Convention in Cleveland which will determine the progress of the Society for several years to come. It seems wise for the Executive Committee at this time to outline the progress that has been made in the last few years, and to outline their thoughts for the future. In order to have a basis to start such a discussion, it seems advisable to outline the functions of any scientific society.

First, there should be local branches whose duty it is to hold regular meetings at which time qualified speakers are called in to discuss special problems. In this way the members have the opportunity of keeping up with new developments and also intimate discussions with outside experts and their local associates. The branches also provide a common meeting ground for members so they may discuss mutual problems and solve them as they are encountered. It is the opinion of the Executive Committee that the branches as they operate today are fulfilling their function, particularly if they have active officers. As far as the Executive Committee can determine, no branch is handicapped by lack of funds when they are properly administered, and all branches are solvent and have balances enough to operate successfully.

The second general function of a scientific society is to have a central or national organization to carry on the broader business details which do not rightfully fall within the jurisdiction of any particular branch. Among the functions of the National Society are the publication of periodicals, the maintenance of membership records, adequate liaison between branches, maintenance of adequate financial stability to assist branches when needed, and maintenance of alertness to trends of the science of the industry. This is necessary to keep all members well informed, and provide a continuation of effort in one direction so that the Society will always be in a position to change its outlook as the science of the industry progresses. Another function carried out by many societies is the planning and supervision of fundamental research work for the general benefit of the Society.

All of these functions are as important as those of the branches and the National Society must be maintained in a strong enough position to continue its functions. The amount of money to be handled by a National Society is, of course, greater than that handled by the local branches because of the expense entailed in the publication of periodicals, maintenance of the membership records, and other duties which fall under their jurisdiction. The National Society should be in a strong

enough financial position so that its duties are not curtailed by lack of income or lack of adequate financial balances.

With the above outline of the duties of a scientific society before us, it seems in order to compare the Society in 1941 with today and the progress made.

Through the efforts of Mr. Kennedy during the years he was Executive Secretary and Editor, the Society grew and progressed rapidly. In 1940 it was felt the branches were performing their duties adequately except in many cases they were handicapped by the inadequate functioning of the National Office. Mr. Kennedy put in full time on his duties and had his family help him, but there was more work than could be done with the personnel available. At that time the balance of the National Treasury dropped as low as $5,000 during the year with a budget of $17,000 per year, and if financial reverses came about it was obvious that the Society as a whole would be in a precarious position. Because of the many duties handled by Mr. Kennedy, it was not possible for him to devote adequate time to any one of his duties as an Editor, Executive Secretary, Solicitor of advertising for the *Review*, or as Business Manager of the Society. After a study of the problem with Mr. Kennedy, it was decided that he should be relieved of the duties of soliciting advertising, which entailed a large amount of correspondence. and traveling. In this way Mr. Kennedy would have more time for the actual duties of Editor and Executive Secretary. The fact that Mr. Kennedy was not in good health also had considerable bearing on this decision. After conferences with many potential advertising agents, a contract was signed with Mr. Bain in September of 1941 to solicit advertising on a commission basis. Results from this arrangement became apparent by the 1942 Convention and the results since that time have shown the good judgment of that decision.

At this time, several changes were instituted in the *Monthly Review*. Time was available to bring the membership records up to date and a start was made to modernize and revise many of the records. Unfortunately Mr. Kennedy was taken ill in February 1942, and from that time until his death in August of the same year, was unable to fulfill the duties of his office. Not only was the death of Mr. Kennedy a loss to the Society, but it was unfortunate that he was unable to see the changes he had worked on completed.

After his death, it became apparent many changes would have to be made in the operation of the Society under the existing wartime conditions. The problem was particularly difficult since Mr. Kennedy was the only full time Editor of the *Review* the Society had ever had, and all of his duties had been performed in such a way that there was no need of others checking on the details. The matter was also complicated by the war, it being impossible to get a full time man to replace Mr.

Kennedy and assume his duties. A meeting of the Executive Committee was held in September, 1942, and at that time it was decided that an office would be set up in New York City under the supervision of Mr. Bain who was appointed Business Manager, in addition to his duties as Advertising Agent. Under this arrangement the Society hired a stenographer to carry on the detailed work of the Society and an arrangement was made whereby only one-third of the rent of the office would be paid by the Society. Today, another stenographer, who is not on the Society's payroll, is available when required for work for the Society.

The duties of Editor and Executive Secretary were to be assumed as a part-time job, and Mr. E. T. Candee was appointed to fulfill these duties. The salaries at that time were adjusted so that they did not exceed the salary paid Mr. Kennedy. It was also possible to reduce the amount expended by the Society for traveling expenses.

Because of the difficulty of having the office in New York and the Printer of the *Review* in Springfield, the printing was moved to New York without increasing the cost of the *Review* per printed page.

Except for minor modifications, the Society operates as outlined above.

(To be continued next month)

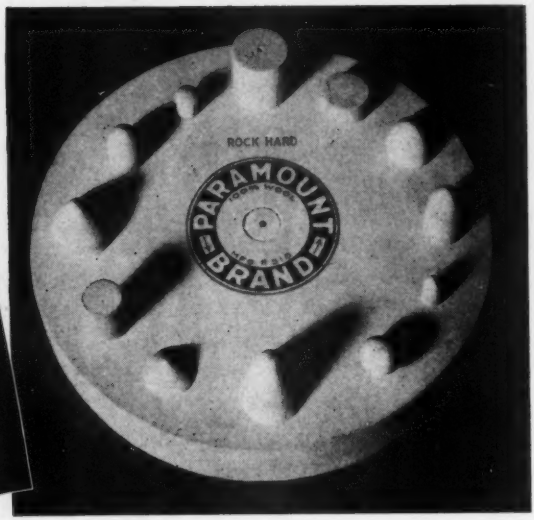
BACK ISSUES OF REVIEW URGENTLY NEEDED

It is the intention of the National Society to bind back issues of the REVIEW so that a permanent file may be maintained. A check of the records reveals the following back issues are missing. Members are urged to send in these issues so our permanent files may be completed.

April 1917
November 1919
August, September, November, December 1932
February, March, May, June, August 1933
November 1940

Please forward copies addressed to The American Electroplaters' Society, 545 Fifth Avenue, New York 17, N. Y.

FELT WHEELS and BOBS



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Standard MULTI-PLATERS provide internal connections for operation from 220, or 440 volt 60 cycle 3 phase supply.

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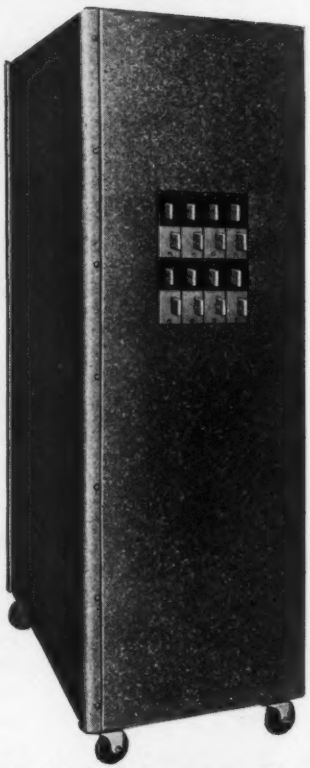
Write Dept. R for illustrated booklet.



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EST. 1892

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ACP Pickle Bath Toner can be used alone in acid baths or with Rodine, the action and effectiveness of which is thereby enhanced.

Manufacturers of Inhibitors & Metal Working Chemicals

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AMBLER ACP **PENNA.**

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Please send me general Technical Service Data Sheets on

☐ Pickle Bath Toner ☐ Rodine

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Company .....

Address .....

N-4

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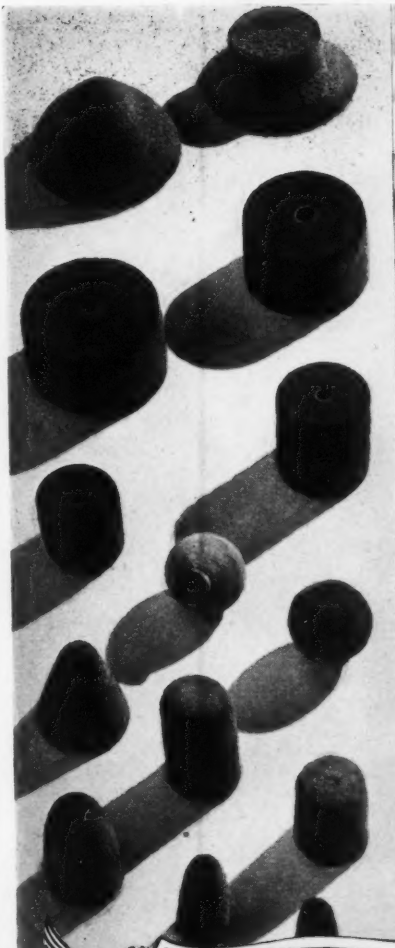

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Factory & General Offices

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Sales Offices in Principal Cities

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DARCO S-51 keeps your solution *completely* clean—helps you squeeze every last dollar's worth of work from it. By *adsorption* this activated carbon removes colloidal impurities, organic decomposition products, soap, grease, oil—and all unsuspected pollution—guards the metal from their dangerous effects.

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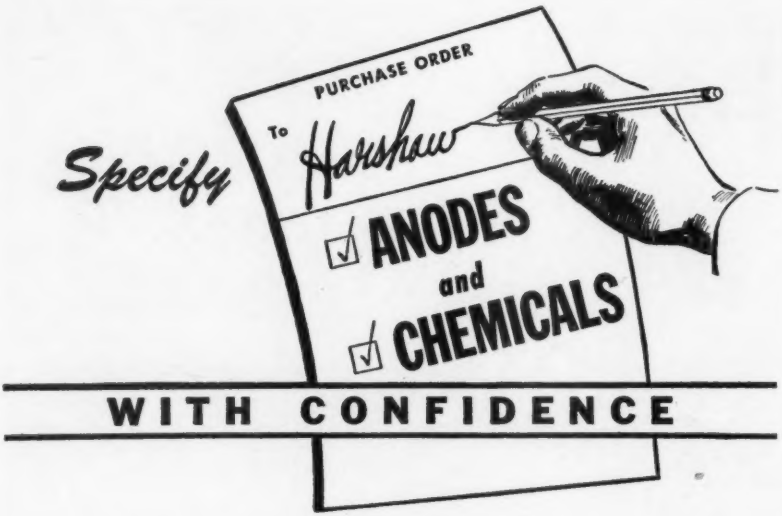
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*



DEPENDABLE plating performance has become an expected regularity with Harshaw Anodes and Chemicals. It's a time-proven fact that you can be confident they will constantly furnish reliable plating performance. This confidence is not unusual because all the research knowledge and practical experience of more than 50 years are incorporated in Harshaw Anodes and Chemicals. When new wartime methods are released for peacetime plating, you can depend upon Harshaw to deliver their usual important share of new plating techniques.

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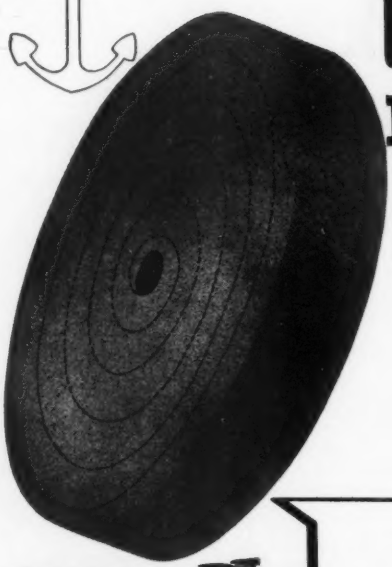

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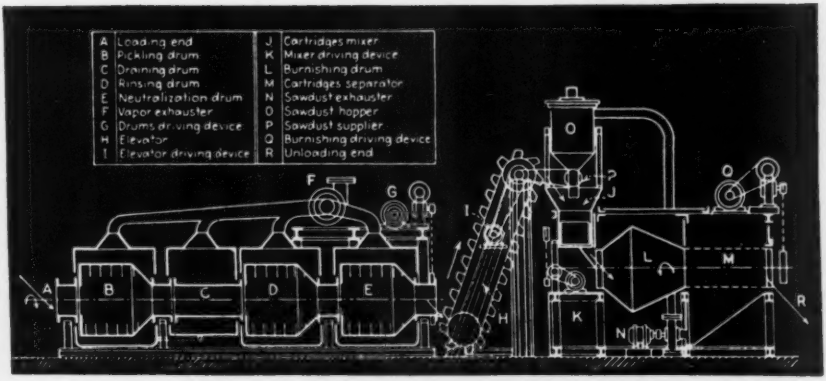

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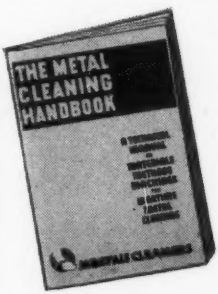

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THE FAST—DEPENDABLE
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for

ELECTROPLATING SOLUTIONS

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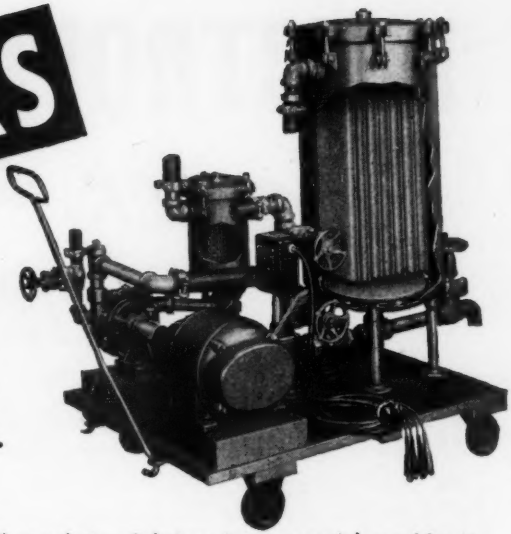
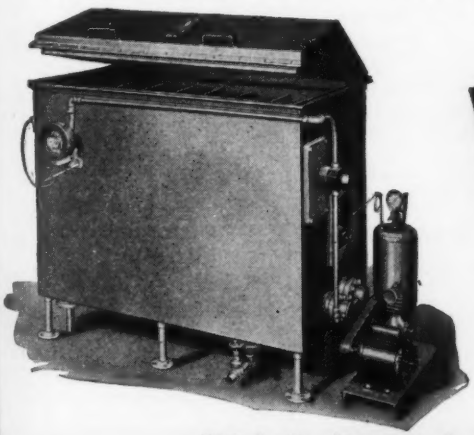


Filtration and Purification of Electroplating Solutions is an essential requisite to produce ***Quality*** plating.

Industrial Filters are built with ***larger*** filter areas, ***more*** sludge holding capacity, and are provided with highly efficient pumps. Based on actual experience in hundreds of leading plants, our filters provide platers with the most practical and efficient means of keeping their solutions Pure and Clean.



SALT SPRAY CORROSION-TEST EQUIPMENT

The modern way to test electroplating or coated metals is with Industrial corrosion test equipment. With this equipment you can pre-determine the quality of work being done, and avoid costly rejects and loss of time. Made in sizes to suit your needs with temperature controlled up to 130 Deg. Fah. Meets Army, Navy Aeronautical Specifications as outlined in Bulletin AN-QQ-S-91-5 dated Dec. 1938, and Others.

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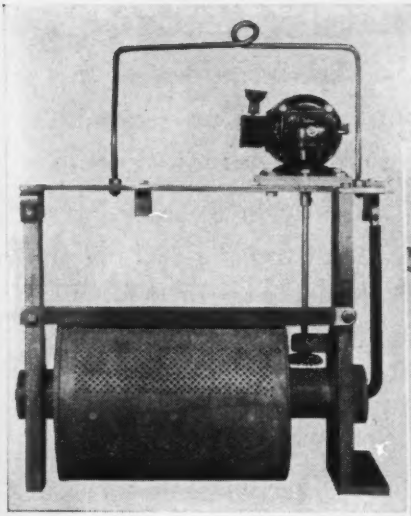

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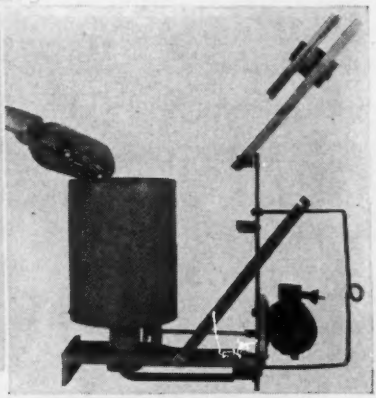

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NICKEL PLATING

By THOMAS McFARLANE

THE subject of nickel plating seems like a rather irrelevant one in these times when the scarcity of nickel metal has restricted its use for plating purposes to negligible proportions. However, the war won't last forever and when we do turn to the production of civilian products again there are going to be many new developments in all types of plating, so it will pay the electroplater to familiarize himself with as many as possible ahead of time.

Of particular interest are the various dull or matte type nickel plating solutions, as any development in bright nickel solutions will probably be along the lines of improved organic brighteners and addition agents rather than in the basic solution itself.

Shortly before the war, there were a number of developments in progress along nickel plating lines, particularly in regards to dull type of deposits, such as the hard and chloride nickel baths of the type developed by Dr. Wesley and E. J. Roehl of the International Nickel Co. Research Laboratory. The advent of war has more or less prevented the industrial development of these solutions as well as the further application of the better known nickel plating solutions. Since not too many people are familiar with these types of solutions, it might be a good idea to review them.

There are a number of solutions, containing a variety of salts, recommended for hard nickel plating but one of the simplest and easiest to control is that investigated by Wesley and Roehl, and which is quite similar to the "White Nickel" solutions which have been used by the building and hardware trade for many years. This type of hard bath contains approximately 5 oz./gal. of Ni metal as $NiSO_4$, 4 oz./gal. of Amm. Chloride and 4.0 oz./gal. of H_3BO_3 and is operated at a pH of 5.5 to 5.9 at temperatures from 120 to 140°F.

The familiar white nickel solution contains approximately 3.0 oz./gal. Ni as $NiSO_4$, 3.0 oz./gal. NH_4Cl and 4 oz./gal. H_3BO_3 is operated at pH of 5.4 to 6.0 and room temperature. The only difference between the two solutions apparently, is a slightly higher Ni and Amm. Chloride content and higher temperature in the hard bath. However this increase in nickel and chloride content in conjunction with the use of higher temperatures results in the ability to plate nickel deposits from this type of bath at current densities as high as 100 amps./ft.^{2} and having a hardness on the order of Rockwell C-50—or about the hardness of hardened steel. The maximum current density recommended in the "white" nickel bath is only 15 amps. per ft.^{2} and is generally less than

5 amps./ft.^{2} in actual practice. Any attempt to plate at higher C. D. would probably result in cracked and peeled deposits.

The writer has never attempted to measure the hardness of the "white" nickel deposits, but they are probably considerably softer than the "hard" deposits due to the lower current density employed.

The pH control in the hard bath is quite critical, the best results being obtained at a pH range of 5.5 to 5.8 when operating at 120-140°F. The hardness is affected by all three variables of pH, Temp. and C. D. and tends to decrease with increasing temperature and to increase with increasing C. D. and pH.

The deposit is extremely fine grained and dense, and although being considerably more brittle than the soft deposits from the Watts bath, it will withstand a fair amount of bending and deformation without cracking. The solution has fair throwing power and high cathode efficiency, and is well-buffered, which property assures the necessary close pH control. The solution is subject to metallic impurities such as FE and copper as are most all nickel solutions and should be purified for best results when made up.

The principal disadvantage of the bath is its tendency to form nodular type trees on sharp corners at the higher C. D. range, and to pit. Pitting can be controlled by the use of peroxide or a suitable wetting agent. By operating at average Current Densities around 50 amps./ft.^{2} and temp. of 130°F., treeing can be held to a minimum.

There are many possible applications for a bath of this type, one of the most obvious being for salvage and repair purposes, where it is probably employed more today than for any other use. Where the abrasion and wear resistance required is not too severe, hard nickel deposits are as good if not better than chromium. Its high rate of deposition, (.005″ per hour at 100 amp./ft.^{2} as compared with approx. .001″ per hour at 400 amp./ft.^{2} for Cr) make it particularly adaptable in cases where a large build-up is necessary on undersize parts. If an extremely hard wearing surface is required, then the last two or three thousands can be finished up with Chromium. It has the advantage over the use of electrodeposited iron for build-up purposes in being both harder and more corrosion resistant. The writer has seen numerous articles such as armature shafts and steel roll faces reclaimed with hard nickel deposits and give continued long service. A disadvantage of hard nickel in this type of application, however, is its tendency to decrease in hardness at elevated temperatures. Above 500°F. the deposit drops considerably in hardness, the longer it is exposed to heat. For this reason heavy deposits of hard nickel should not be ground or machined at speeds that will heat the metal to the 500° temp. or over.

The application of hard nickel deposits to commercial products such as hardware has never as far as the writer knows been tried. It

lends itself to high speed production however, and would produce a much more abrasion and wear resistant surface for such articles where that quality is necessary, while affording the same if not better corrosion resistance as other nickel deposits.

It is however, too brittle to withstand severe forming operations after plating. It is suitable for such specialized uses, also, as electroforming with its high tensile strength, of around 170,000 lbs./in.^{2}

THE ALL CHLORIDE BATH

The chloride bath is a deviation from the usual type of nickel solution in that it contains nothing but nickel chloride with some boric acid for buffering purposes. The use of all chloride electrolytes is not an entirely new idea, it having been used in nickel refining solutions a number of years ago. However, it was not considered to any extent for electroplating purposes until Dr. Wesley investigated it rather thoroughly and developed a bath with interesting and unusual properties. A chloride bath of this type contains simply: 40 oz./gal. $NiCl_2$ and 4 oz./gal. H_3BO_3, operated at a pH range of 1.0 to 5.0 and temperatures 120°-150°F. This bath has an extremely wide range of plating conditions at which sound deposits can be obtained, as is evident by the wide pH range usable. A variety of deposits can be obtained from this solution over the wide range of current density and pH conditions; probably more so than any other nickel solution in use.

Deposits having a dark velvet like surface appearance can be obtained at the higher pH range of 3.0-5.0 and intermediate Current Densities of about 50 amps./ft.^{2}. Lighter deposits result as the pH is lowered and C.D. increased until a semi-bright deposit is obtained at low pH of 1.0 to 2.0 and C. Densities of 75 amp./ft.^{2} and higher. These different surface effects of the deposits do not have any clear cut range of operation and may be shifted due to effect of temperature changes. All deposits obtained from this solution however are easily buffed to a bright finish. They are intermediate in hardness between the soft sulphate deposits and the hard nickel deposit, having a hardness of 230 vickers or about Rockwell 20 C. They are considerably tougher than the soft nickel deposits and not as brittle as the deposit from the hard bath, having a tensile strength of approximately 100,000 lbs. per square inch as compared with 50,000 lbs./in.^{2} for the soft, sulphate type of deposit.

This solution has a very high conductivity and its wide plating range makes it suitable for high as well as low current density plating. The writer participated in experiments with this solution on a laboratory scale using specially designed apparatus, with which we were able to obtain sound nickel deposits on ¼ inch steel rods at current densities in excess of 3000 amps./ft.^{2}. The pH of the solution in these ex-

periments was dropped to 0.5 and the temperature raised to about 170°F. An interesting observation from these experiments was the fact that the current densities obtainable were not limited by any chemical change or breakdown of the solution but only by mechanical difficulties in construction of proper apparatus. This was only a laboratory experiment but it indicates the possibilities latent in this type of solution.

The chloride bath has several operational advantages which make it better from an economy standpoint than the other types of nickel baths.

In the first place the tank voltage in this bath, due principally to its high conductivity, is only about half that encountered in the regular sulphate solutions, when measured under the same conditions of temp., C.D., anode and cathode area, and anode to cathode spacing. This represents a considerable savings in power costs and means that one could expect to almost double the Current Density obtainable by just substituting the chloride solution for the sulphate solution and using the same generator voltage.

Anode and cathode efficiencies are also higher in the chloride solution. This is particularly true at low pH's around 2.0 and low C.D., under which conditions the cathode efficiency of the sulphate type solution drops off rapidly whereas the chloride cathode efficiencies remain practically constant at 98 to 99%. At the higher pH range around 5.0 the difference in efficiency is less however, between the two types of solutions.

Anode corrosion is good in the chloride bath as would be expected from its high chloride content, much less anode sludge and loose nickel particles being encountered. For many types of work, anodes can be used without bags in this bath, but if bags are used, the fibre glass bags are best due to the corrosive nature of the electrolyte. Treeing on corners and edges is also noticeably less in this solution in the production of heavy deposits, the edge build-up assuming the shape of small rounded nodules and ridges instead of the long branched trees characteristic of sulphate solutions. The solution is easy to control due to its simple composition and its wide plating range makes it almost foolproof to operate. Pitting is seldom encountered, even at low pH and can be controlled if it does occur, with peroxide or wetting agents. Duponol M. E. and Orvus are two of the few wetting agents that can be employed safely in the chloride bath, most of the wetting agents being decomposed by the chloride electrolyte.

Deposits from the chloride bath are fine grained, considerably more so than soft nickel deposits, but somewhat more coarse than hard nickel deposits. Porosity tests show the chloride deposits to be of the same

order of porosity as the soft nickel deposits, and to give equivalent protection against corrosion.

The principal disadvantage of this type of solution is its corrosive nature, particularly at higher temperatures and low pH. Rubber lined steel tanks will handle the solution effectively, and Duriron pumps and heating equipment can be used; both lead and plain iron being attacked at an appreciable rate by the solution.

The chloride type of solutions have had very little commercial application as far as the writer knows up to the present. Whether it is reluctance to try out something different or prejudice against the thought of using such strong electrolytes, we can't say. The many apparent advantages of the bath makes it potentially important however for post war usage when it will probably be developed to an even better extent than herein described, with possible changes in composition which will make the solution less corrosive when used at low pH's. The high C.D. possibilities of the bath suggests a specialized use for it in high speed plating of strip steel at the mills. This idea of pre-plated steel stock for manufacturing purposes, is incidentally another development that may be expected after the war. It is already being done on a large scale on tin and zinc plating of strip steel and may spread to large scale plating of the other metals such as nickel, copper and lead, etc. In fact the writer was recently informed by a representative of one of the steel companies that experiments were being carried out on high speed plating of strip steel with copper, nickel and lead, for the possible production of preplated stock, with these metals at the mill.

We may see the day when we will be buying pre-plated steel stock and stamping a large variety of finished articles out of it. When that happens we may find ourselves with very little—or nothing to do in the plating room. That may sound a little far-fetched but it is something to bear in mind.

It is appropriate at this time to discuss the sulphate or Watts type bath also. While it is by no means a new development in nickel plating, still it hasn't been utilized to a great extent in some parts of the country, particularly its use at the low pH range. It was probably one of the first nickel solutions developed which could be used for fairly high C.D. plating, and the automobile industry has made further use of it probably than any other industry for the production of such articles as automobile bumper bars, where a fairly heavy deposit of approximately .001″ to .00125″ of deposit is needed.

The average hot Watts bath contains approximately: 40 oz./gal. $NiSO_4$, 6 oz./gal. $NiCl_2$, and 4.0 oz./gal. H_3BO_3. It can be operated at either a low pH of 2.0 to 3.0 or high pH of 5.0 to 6.0 and at temperatures from 100 to 150°F. The bath is more efficient at the high pH and temp., the efficiency dropping off at low pH, to 85% at pH 2.0 and at

low C. Densities. However, the bath can be operated at considerably higher C. Densities at the low pH range and will produce more ductile deposits under these conditions. Operating at a pH of 2.0 and a temp. around 130°F., current densities of 75 to 100 amps./ft.^{2} can be used. These higher current densities however, require good agitation of solution and work to prevent burning on edges and excessive treeing, the best normal operating conditions bing 50 amps./ft.^{2} at pH 2.0 and 130°F. Deposits prepared under these conditions are very soft and extremely ductile—much more so than those obtained from any other solution. A comparison of the values for per cent elongation obtained with standard tensile specimens prepared from deposits from soft, chloride and hard nickel solutions will demonstrate this. The per cent elongation in two inches of the average hard nickel deposit is only about three per cent. For the average chloride deposit it is about fifteen per cent and for the soft deposit it is about thirty per cent. As an item of interest for those who are not familiar with it, the writer might explain the method used in preparing these tensile specimens for testing electrodeposits. A stainless steel plate about 3″ x 10″ is plated in the bath under the proper conditions until a deposit .010″ to .015″ thick is obtained. The edges are then sheared off and the deposit lifted from the starting sheet. The tensile specimen is then cut or machined from the center of the deposit to standard shape and dimensions. A two inch length is accurately marked off on the reduced section of the specimen and it is then pulled apart on a tensile machine. The two pieces are then put together and the distance between the marks again measured. The percentage that the distance between the lines has increased over two inches is taken as the percent elongation of the deposit. If the specimen had stretched to a length of 2½ inches between the marks before breaking, then the percent elongation would be accordingly, 25%.

Getting back to the Watts bath, the softness and ductility of the deposit from the low pH high temp. solution, makes it ideal for plating on articles that must be further formed or stamped after plating. These deposits are not as easily buffed as those from the chloride bath for example, due to their coarse grained structure, but they can be buffed to a high finish when necessary. The solution is susceptible to pitting particularly at low pH operation. Here again peroxide and proper wetting agents can be employed to overcome this.

Harder deposits, approaching the hardness of the chloride deposits can be obtained in the low pH Watts solution at room temperature. However, the permissible C.D. range is restricted to below 50 a.s.f. due to the tendency of the deposit to become embrittled, and there is of course a subsequent loss of ductility.

The hot Watts solution, either at high or low pH has a wide range

of commercial application and has not been utilized as fully as it should, particularly in the building and hardware trade. It has the advantage over the chloride solution in not being very corrosive and not much more difficult to control. It probably is more susceptible to impurities however such as the heavy metals, and to contamination by dirt and grease which cause the pitting.

In regards to this problem of pitting, in dull nickel solutions in general, the writer would like to say something about the use of peroxide and wetting agents for overcoming this trouble. I'd like to present the general conclusions drawn from the results of laboratory experiments I had the opportunity to observe, conducted on the usage of representative types of organic wetting agents and peroxide for control of pitting. The following observations were made:

(1) All the wetting agents investigated, and the peroxide were effective in prevention of pitting.

(2) The wetting agents were superior to peroxide in reducing porosity in the deposits.

(3) In the production of heavy nickel deposits all the wetting agents promoted edge growth and cut down the covering power of the solution on under surfaces of the specimen plated. Peroxide does not have such an effect.

(4) More careful control is necessary with wetting agents than peroxide, a small excess of the wetting agents tending to have an adverse effect on the physical properties of the deposits and to restrict the C.D. range.

(5) Different wetting agents have individual effects on different types of deposits. In the Watts bath at high pH for example, most of the wetting agents had a bad effect on ductility of deposit and the plating range, while at low pH the Watts bath is not so sensitive to the effects of the wetting agents.

(6) Peroxide is safe to use on all three of the dull type nickel solutions discussed, having a slight tendency to decrease ductility in the high pH Watts bath only.

(7) Only one of the wetting agents tried appeared to be safe to use on all three types of solution.

From this it can be seen that care should be taken in selecting an anti-pitting agent for use in the dull nickel solutions, taking into consideration, the type of solution being used and conditions under which it will be operated. A good example of the effect of wetting agents is shown in the commercial bright nickel solutions. Peroxide cannot be used with these solutions due to its tendency to oxidize the organic brighteners and so wetting agents must be used to control pitting. An excess of the wetting agent as you have probably noticed, usually results in brittle deposits and restricted plating range.

All these solutions discussed are operated at elevated temperatures. It is much more convenient to operate from cold solutions such as the white nickel solutions used predominantly in these parts. However, with this low C.D. type of cold solution it takes a lot of tanks to handle a large production and any increase in production over the maximum capacity of the tanks in use means more tanks. It was recently called to the writer's attention that it took an hour and 45 minutes to attain .0003" deposit of nickel on a war job in a "white" nickel solution. The same part plated at 50 amps./ft.^{2} in the chloride or hot Watts bath could be done in 10 minutes, or even 20 minutes at 25 amps./ft.^{2}. We don't know how much nickel plating will be done to specification after the war, but it will probably be more than was done before, and there will undoubtedly be a large increase in the building industry in general. It may be necessary to speed up production and if so it will be an advantage to know just what types of solution will suit your particular purpose.

There is one other point the writer would like to bring up in connection with nickel plating, and this is the use of pure electrolytic nickel for anodes. It has long been an idea in the plating industry that nickel anodes should have a "depolarizer" of some sort in them to prevent them from going passive. A breakdown of the components of the total tank voltage in commercial nickel plating baths will show that at C.D. down to 20 or even 10 amps./ft.^{2}, the anode polarization is a very small percentage of the total voltage whether electrolytic nickel or regular rolled depolarized anodes are used. Tests have shown that in nickel plating baths containing the normal amount of chloride, electrolytic nickel will corrode with almost one-hundred per cent efficiency and will not be rendered passive even when subjected to anode current densities as high as 170 amps./ft.^{2}. It is only in solutions containing no chloride at all that the depolarized type of anodes show an appreciable higher activity than electrolytic nickel, which rapidly becomes passive even at low C.D. in this instance. Since practically all commercial nickel solutions contain chlorides or some other halogen ion such as fluorides, this becomes no problem. The electrolytic nickel anodes do result in more metallic sludge on corroding however, than the regular cast or rolled anodes, but the amount, (less than one per cent by weight) is low enough that it does not mean excessive waste, and if the anodes are bagged, will not cause rough deposits. Electrolytic nickel corrodes most smoothly at pH's of 2.0 or lower, producing a rougher, spongier, surface at high pH. The high efficiency of corrosion holds at both high and low pH however.

This then is another possible source of nickel metal for anodes which may possibly be cheaper than the regular types of anodes, after the war.

In closing, let us briefly summarize these various points which have been covered.

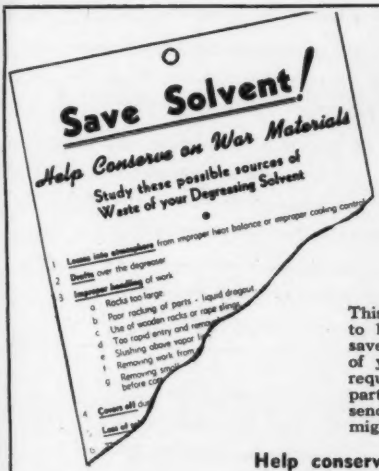
First, the hard type nickel solution, was considered, a high pH, hot, sulfate NH_4Cl solution operating at current densities up to 100 a.s.f. from which hard abrasion resistant deposits can be obtained. Suitable for salvage and repair purposes and wherever an abrasion resistant deposit is necessary.

Second the chloride type of solution, simple of composition in which a wide range of plating conditions from low to high pH and low to very high C.D.'s can be employed. Producing easily buffed deposits of intermediate hardness, covering a wide range of applications. A highly efficient, economical bath to operate and easy to control. It's main disadvantage, a corrosive type of solution.

Third, the hot sulphate Ni-Chloride, or Watts bath operated at either high or low pH at C.D. normally up to 100 amps./ft.^{2}. Produces very soft ductile deposits at low pH, suitable for further forming or stamping operations. Fairly easy to control and fairly efficient particularly at higher C.D. and pH. Particularly subject to pitting and contamination from foreign matter.

Finally there is the possibility of using electrolytic nickel as anode material for Ni plating baths.

There undoubtedly will be, and are, other and newer developments in nickel plating coming along of which we won't hear until after the war. These solutions discussed above are, you might say, a forerunner of things to come.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The Fundamentals of Chemistry for Electroplaters

Part VI. Chemical Formulas: Their Determination and Use

By SAMUEL GLASSTONE, D.Sc., Ph.D.

CHEMICAL FORMULAS

IT was indicated in Part III (*Monthly Review*, Jan. 1944) that every chemical compound could be represented by a formula which showed the numbers of atoms of the various elements that were present in the particular compound. For example, it was stated that the formula of water was H_2O, since it was made up of two atoms of the element hydrogen and one atom of oxygen; sulfuric acid was given the formula H_2SO_4, because it represented a combination of two atoms of hydrogen, one atom of sulfur and four atoms of oxygen. These formulas were given in the earlier article to illustrate Dalton's statement that when two or more elements combine to form a compound they do so as the result of the union of whole numbers of atoms of the various elements. However, no indication was given at that time of the method used for determining the formula of a chemical compound. With the information available concerning molecular and atomic weights, as given in Parts IV and V (*Monthly Review*, Feb. and March 1944), it is now possible to understand how such formulas are obtained.

DETERMINATION OF FORMULA OF A COMPOUND

The first step in the determination of the formula of any compound is to make a complete chemical analysis of the substance, which should, of course, be as free as possible from impurities. This analysis must identify all the elements in the compound, and the amounts present must also be found; these amounts are usually expressed in terms of the per cent of each individual element, that is, the parts by weight of the element present in 100 parts of the compound. Without going into details at present, it can be stated that methods are available for carrying out such analyses, so that it may be assumed that the required information can be obtained in this manner. A simple example will be taken for purpose of illustration: a complete analysis of pure water shows it to consist of 11.2 per cent by weight of the element hydrogen and 88.8 per cent of oxygen, no other elements being present.

The figures obtained by the analysis give the proportions by weight of the elements in the compound; for the present purpose, what is re-

quired is the proportion by atoms, and this is obtained upon dividing the weight of each element present in the compound by its atomic weight. To refer to the example of water, given above, the atomic weights of its constituent elements are 1.008 for hydrogen and 16.00 for oxygen (see Part III). It follows, therefore, that in water:

$$\text{Proportion of hydrogen atoms to oxygen atoms} = \frac{11.2}{1.008} \text{ to } \frac{88.8}{16.00}$$

$$= 11.1 \text{ to } 5.55.$$

The proportion of 11.1 to 5.55 is almost exactly 2 to 1, and so it can be stated that in water:

Proportion of hydrogen atoms to oxygen atoms = 2 to 1.

Using the symbol H for the element hydrogen and O for oxygen, it is seen that the simplest formula for water must be H_2O; this gives the correct ratio of 2 to 1 for the hydrogen to oxygen atoms.

THE FORMULA OF WATER

It is possible that the formula of water might be H_4O_2 or H_6O_3, since the ratio of hydrogen to oxygen atoms would still be 2 to 1; a decision between the various possibilities can, however, be made by means of the molecular weight. The latter is always equal to the sum of the atomic weights of all the constituent atoms in the molecule; hence, if the formula of water were H_2O, the molecular weight would be 2×1.008 (for two hydrogen atoms) plus 16.00 (for the oxygen atom), that is, 18.016. On the other hand, if the formula were H_4O_2, the molecular weight would be double this value, i.e., 36.03, and so on. Experimental determinations of various kinds, along the lines described in Part IV, show that the molecular weight of water vapor is about 18, and hence the formula must be H_2O. Not in all cases, however, is the simplest formula identical with the actual formula, although it frequently is so. For example, hydrogen peroxide is also a compound of the elements hydrogen and oxygen, and calculations show that the molecule contains equal numbers of hydrogen and oxygen atoms; the simplest formula is consequently HO. Molecular weight and other evidence, however, indicates that the actual formula is H_2O_2, giving a molecular weight of about 34, instead of 17 for HO.

THE FORMULA OF SULFURIC ACID

Another, slightly more complicated, case is the determination of the formula of sulfuric acid; this substance is found upon analysis to consist of 2.06 per cent by weight of hydrogen, 32.69 per cent of sulfur, and 65.25 per cent of oxygen. The relative proportions of the atoms of these three elements in sulfuric acid are obtained upon dividing the weight proportions (or percentages) by the respective atomic weights,

i.e., 1.008 for hydrogen, 32.06 for sulfur, and 16.00 for oxygen. The result is:

$$\text{Proportion of H to S to O atoms} = \frac{2.06}{1.008} \text{ to } \frac{32.69}{32.06} \text{ to } \frac{65.25}{16.00}$$

$$= 2.04 \text{ to } 1.02 \text{ to } 4.08$$

$$= 2 \text{ to } 1 \text{ to } 4.$$

The compound sulfuric acid thus contains the elements hydrogen (H), sulfur (S) and oxygen (O) in the proportion of 2 atoms of H, to 1 atom of S, to 4 atoms of O, so that the simplest formula is H_2SO_4. Although the direct determination of the molecular weight of this substance cannot be carried out easily, there are good reasons for believing that the actual formula is identical with the simplest formula, namely H_2SO_4.

It is unnecessary to give further illustrations, for the general principle employed in determining molecular formulas are almost invariably the same. First, the substance is analyzed so as to obtain the proportions of the various elements by weight; these are then divided by the respective atomic weights to obtain the relative atomic proportions of the various elements. The simplest ratio of whole numbers corresponding to these proportions gives the simplest formula of the compound. The actual formula, which is the same as or a small multiple of this formula, is then fixed by the aid of the molecular weight or other information.

USE OF CHEMICAL FORMULAS

By the use of the method just described the formulas of many chemical compounds have been established, and the results are well known. It is then possible to reverse the calculations so as to obtain the composition of any particular compound; such calculations are of great practical importance in many aspects of chemistry and electroplating. For instance, the formula of silver cyanide has been established as AgCN, so that it contains one atom each of the elements silver (Ag), carbon (C) and nitrogen (N). An examination of atomic weight tables (see Part III) shows that the atomic weights of these elements are 107.9, 12.0 and 14.0, respectively. Consequently, silver cyanide contains 107.9 parts by weight of silver in a total of 107.9 + 12.0 + 14.0, i.e., 133.9. It follows, therefore, that the percentage of the metal silver in silver cyanide is given by

$$\frac{107.9}{133.9} \times 100 = 80.6 \text{ per cent.}$$

Another case of particular interest to electroplaters is to determine the amount of chromium in chromic acid; the formula of the latter substance is CrO_3, so that it contains one atom of chromium (Cr) to three atoms of oxygen. The atomic weights of these elements are 52.0 and 16.00, respectively, so that chromic acid contains 52.0 parts by weight of chromium to 3×16.0, i.e., 48.0, parts of oxygen. Since $52.0 + 48.0$ happens to be exactly 100, it is immediately obvious that chromic acid contains 52 per cent of the metal chromium. This result is of practical value, because it provides information concerning the amount of chromic acid which must be added to a bath in order to replace a known weight of metallic chromium that has been plated out.

Provided the formula of a compound is given, and the atomic weights of the elements contained in it are known, it is possible to calculate the percentage of any element that may be present. The formulas of all common substances are well known, and these, as well as atomic weights, are to be found in tables; hence, all the information is generally available for the evaluation of the composition of any required substance.

★ ★ ★

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A-1 Photo

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Wyandotte Metal Cleaning Compounds are *just* such an ally. Specialized for their tasks, they are built to dish it out with instant effectiveness even where the going is toughest. Saving time and labor, they are long lasting, easy to use, and make friends with any budget.

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NEW!
A "SLIDE RULE" FOR PLATERS

The Jernstedt Electroplating Computer accomplishes the following:

- ▶ Computes chemical additions required in a plating bath of any gallonage, including cyanide additions for complexing metal salts.
- ▶ Indicates weight of metal deposited on unit area, given the thickness. Metal costs can be quickly determined.
- ▶ Lists usual cathode efficiencies of all modern electroplating solutions.
- ▶ Gives plating time required to deposit a given thickness of any metal.
- ▶ Computes current density required to produce a deposit of given thickness.
- ▶ Indicates thickness of deposit resulting from an established plating time at a known current density.
- ▶ Provides space for recording the standard composition of twenty different plating solutions. The normal temperature of operation and gallonage of each solution can also be recorded.

The Jernstedt Electroplating Computer does for the plater what a slide rule does for the engineer. Lengthy calculations are eliminated by the use of simple logarithmic scales. With it, you can save time and prevent costly errors.

Rugged and simple in design. Made from a special type of synthetic resin, highly resistant to chemical action and normal handling.

Economically priced at $7.50, f.o.b. Matawan, N. J., this is one "tool" you will surely want to have handy in your plating department or shop. Send check or money order for your Computer today.

- ▶ Lists component parts in per cent by weight of salts commonly-used in electroplating.
- ▶ Lists commonly-used metric conversion equivalents.

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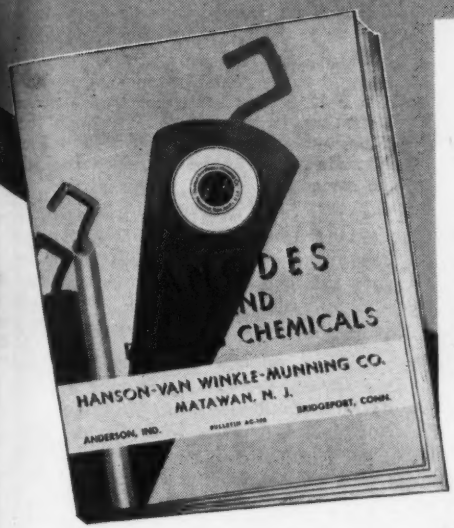

Double-check this latest electro-deposition data

- ▶ Describes the most efficient uses of nickel, copper, zinc and cadmium anodes.
- ▶ Indicates which anodes will most efficiently meet prescribed needs.
- ▶ Gives an up-to-date description of most-used electroplating chemicals.
- ▶ Provides latest data on electro-deposition processes and procedures.
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This new H-VW-M Anode Bulletin brings you right up to the minute on proper anodes and chemicals to maintain the desired metal content in your electroplating solutions. With this booklet handy, you'll find it easier to order and specify necessary items, in this way saving your time as well.

All the questions you are likely to ask will be quickly answered by this new informative bulletin. Write today for your copy, and be sure of having it when you need it. It may save you valuable hours in an emergency.

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5419

INDUSTRY NEWS

LUX TO OAKITE

In connection with its extension program to provide still further service to the metal working industry, Oakite Products, Inc., New York, announces the appointment of Gerald A. Lux to its Technical Staff. He will make his headquarters in New York.

For two years a research associate of the American Electroplaters' Society at the National Bureau of Standards and with many years' experience as a development engineer, chemist and research director in connection with metallurgical and chemical problems involving the use of alkaline and related cleaning compounds, Mr. Lux will devote a large part of his time to Field work in an advisory capacity on special problems and developments. In addition, he will conduct research studies on metal surface preparation and finishes in Oakite's Research Laboratories in New York.

COWLES RESEARCH FURTHER EXPANDS

In line with the recently announced Research Expansion program, Dr. Clinton W. MacMullen, Technical Director of the Cowles Detergent Company, announces the following additions to the Research staff:

Dr. Frederic C. Jelen who graduated from Massachusetts Institute of Technology in 1931. He received his Master's degree from the same institution, as well as another Master's degree and his PhD. from Harvard in 1935. Since that time Dr. Jelen has been with the Monsanto Chemical Company and The Battelle Memorial Institute, from which he comes to Cowles.

R. C. Shaver, a 1939 graduate of Syracuse University, with a Master's degree in chemistry. He has been an industrial fellow and on the teaching staff at Syracuse. He formerly worked in the laboratories of the Sealright Co., Inc.

Noel R. Phillips, graduated from the New York State College of Forestry, Syracuse University in 1941. He was employed as chemist by the Southland Paper Mills and R. T. Vanderbilt Company prior to coming with this Company.

John L. Biester, received his undergraduate training at Beloit College and his Master's degree at Syracuse in 1943. He was formerly in the Research Department of the Standard Oil Company of Indiana.

MITCHELL-BRADFORD GETS PATENT

Mr. A. J. Mitchell of the Mitchell-Bradford Chemical Company of Bridgeport, Connecticut, Manufacturers of Protective Coatings, has been granted a patent No. 491534 for the processing in BLACK MAGIC and WITCH DIP, of steel precision gages for visual control, protection against corrosion from sweaty and acid filled hands, visual inspection of flaws and cracks, and protection against tampering.

The gage is blackened in the BLACK MAGIC bath to a depth of penetration approximating .0001", and given a final

coating of WITCH DIP wax. The gage is then placed into service and used until the bright steel shows through the blackened surface when it is laid aside for checking after which it may be reblacked and again placed in use and the process continued until the entire tolerance is used up. Most gages have a tolerance beyond .0001" and the process results in the saving of much time and money on gage checking. On plain steel, where there is no indication of wear, the checking must take place at short periods to insure correct gaging.

The BLACK MAGIC process does not change the dimensions of the gage, hence its usefulness for gage protection. The process is already in use by a substantial number of plants using steel gages, micrometers, etc.

MILWAUKEE BRANCH ANNUAL MEETING

APRIL 29th HOTEL SCHRODER

Educational Session 2 P. M.
Banquet 7 P. M.

Information Please Program

Price $3.50

CHEMISTS CHEMICAL ENGINEERS

Men wanted for research and experimental work in electroplating.

Write for application.

BATTELLE MEMORIAL INSTITUTE
COLUMBUS 1, OHIO

McKIBBEN PASSES

Mr. H. W. McKibben, long a member of the San Francisco Branch passed away at his home March 1st.

Mr. McKibben was connected with the Keystone Metal and Plating Company. During his long association with the Branch Mr. McKibben was a vital and active member.

LEACREST PARTY

Word comes from Bob Leather that the annual Leacrest Spring party will be held this year Saturday, May 6th.

Last year the party was cancelled because of driving restrictions the result being a keen disappointment to New England friends of Lea.

The huge party attended by hundreds has almost become an institution in New England.

This is a day of fun and it's a sure bet May 6th will be circled in red on many a desk pad.

RICHARDS PASSES

Hedley J. Richards of the St. Louis Branch died suddenly March 20th at the age of 78.

Mr. Richards came to America from England at the age of 20. He was actively engaged in the plating industry for 45 years.

During 1917 and 1918 Mr. Richards was Editor of the *Review*. Poems he wrote were quoted internationally.

Mr. Richards was Vice President of LaSalco up to 9 years ago when he retired.

Numerous friends throughout the industry will mourn Mr. Richards passing.

WILBUR G. STRATTON

On December 26, 1943 Bridgeport Branch lost one of its most loyal and sincere members by the death of Wilbur G. Stratton. Born November 6, 1865, "Bill" Stratton was a tradition in plating following as he did in his father's footsteps. As a young man he learned the plating business working at the Bradley Hubbard Co. in Meridan, Conn. where his father was foreman plater for many years.

In the true tradition of many of the old Connecticut "Valley" platers, Bill Stratton achieved a proficiency in barrel brass plating that is still spoken of with great respect. His death brings to completion almost sixty years of activity in the industry.

Bill Stratton was one of the founders of the Bridgeport Branch and its first President. He also served as Vice-President of the Supreme Society. As the years went by Bill never lost his interest in the A.E.S., rarely missing a meeting, and served on the Board of Managers of the Bridgeport Branch up until his death.

The loss of Bill Stratton is sincerely mourned and his interest and loyalty will not soon be forgotten.

HIGHLIGHTS OF THE CONFERENCE COMMITTEE ACTIVITIES

CHAIRMAN JOHN HONNECKER of the Educational Program reports some papers on very timely subjects—new developments and improvements on existing processing. He states there is some space on the program for any papers from our Branches and hopes for an active Branch participation.

The Hotel management advises that accommodations are being rapidly reserved. If you have some preference as to location or combination of rooms get that reservation to them at once. By now all Branches have a supply of the Hotel reservation cards, get yours and send it in as soon as is possible.

As a relaxation from the serious side of our Conference we are assured of the co-operation of the International Fellowship Club acting as hosts for Fellowship Night, an event where you can pick up the threads of old acquaintance and catch up on the activities of the past year. Of course the ladies are included in this occasion, what would International Fellowship Night be without them?

In addition, Chairlady Mrs. P. Ross Lyons of the Ladies' Committee tells us her Committee has worked hard in providing for the entertainment and welfare of our lady guests. Aunt Ella will be present to entertain and they have scheduled other important events to occupy our ladies. Mrs. Lyons assures our members that their wives and daughters will not experience a dull moment while attending the Conference.

The Publicity Committee has prepared a small attractive sticker to be affixed to your correspondence, calling attention to this important Conference. If you care to boost the attendance and bring the Conference to the attention of the profession in general send for a supply—address E. Steen Thompson, 905 West Tenth, Erie, Pa., a supply will be forwarded at once, use them and bring out some potential A.E.S. members.

It is not too soon to give a thought to transportation facilities. Acquaint yourself with train schedules and make the necessary reservations well in advance that you may enjoy uninterrupted travel and arrive in Cleveland feeling fit and in a receptive mood for the sessions ahead. Remember our slogan "Thru Science to Victory"—do your share by bringing your technique up to date at the Cleveland Conference.

for increased corrosion resistance of zinc

If you have been called on to switch from cadmium to zinc . . . if it is necessary to meet requirements of corrosion resistance such as those of specification AN-P-32, revision 2 ...that's where ANOZINC can help turn the trick.

For countless parts where corrosion resistance is vital. ANOZINC offers a fast, inexpensive method of producing by anodic treatment a corrosion resistant coating on zinc plating and certain zinc base die castings. By this means, you can utilize a zinc plated finish for countless applications where the effects of outdoor exposure or handling formerly made it impractical. Parts finished in an ANOZINC bath, for example, have stood up in excess of 200 hours under the Army-Navy salt spray test AN-QQ-S-91.

Available in two attractive finishes — black or yellow. For many parts formerly plated or black finished, this treatment has resulted in a more attractive finish as well as longer service life. Two finishes can be obtained—a deep, semi-lustrous black and a brassy, slightly iridescent yellow. A different bath is used for each color, and slight variations can be obtained within the two color ranges.

In most cases, existing plating facilities have been readily converted for use with this process. The constituents of ANOZINC baths are stable and can be readily controlled by any competent plater. The salts are inexpensive and no license agreement need be executed in connection with their use.

Write for further details. For a short informative leaflet or for detailed information about ANOZINC, write to the nearest office — indicating the size, quantity and nature of the parts to be treated, and the type of zinc plating or die casting used. Your inquiry will receive immediate attention.

OTHER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

☆**UNICHROME ALKALINE COPPER** for smooth, lustrous copper plating in a non-cyanide bath.

☆**UNICHROME ALKALINE ZINC** for smooth, lustrous zinc plating in a non-cyanide bath.

☆**UNICHROME ALKALINE STRIP BATH** for speedy removal of copper, chromium, zinc, etc., from steel and cast iron without etching the base.

☆Trade Mark Reg. U. S. Pat. Off.

☆**UNICHROME RACK COATINGS** specially formulated to stand up under the most severe operating cycles.

☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS** specially formulated to meet specific plating problems.

☆**UNICHROME CLEAR LACQUERS** specially formulated to meet specific finishing requirements.

☆**UCILON** — a corrosion-resistant material for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

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Convention Exhibits

By WALTER PINNER

DURING the past month, enthusiastic response has been received from many branches of the Society regarding the exhibits at the Cleveland convention. You can't afford to miss it and your Branch, if it is among the few not yet heard from, cannot afford to miss participation.

We are promised the first electroplating dynamo built in America; documents on plating procedure practiced many years ago; old clocks and watches; old automotive parts used long before Mr. Ford's Lizzy became a Lady. Your National Exhibits Chairman is grateful for the cooperation extended by the Branches which have already taken action in planning their part. Time is getting short, and we urge that you, who have not formulated definite plans, do so at once. Space must be allotted and provisions made for properly displaying your contributions.

The Convention Exhibits Chairman, appointed by the Cleveland Committee, is Mr. Louis Piovarcy, 1029 Pembrook Road, Cleveland Heights, Ohio. His job is to help all of you, but he must know what you will need in order to intelligently serve you.

Remember, your Exhibits do not need to have anything to do with plating. We are, in effect, having a museum display. Who can tell—maybe the National Geographic Society will offer to buy us out. We doubt it, but anything is possible these days.

We want to go the fish story one better. Remember? It's the one about the fellow who, seeing the huge sea monster mounted on a board, said that the fellow who caught that one was a liar.

This will be the last published article regarding the exhibits. We'll see you in Cleveland.

NEW Equipment Materials Supplies

EMULSION CLEANER CONCENTRATE PENNSALT EC #2

This concentrate type emulsion cleaner comprising soaps, blending agents, and co-solvents for industrial grease cleaning applications, is soluble in water and in hydrocarbon solvents. It may be diluted with from 5 to 20 parts of suitable solvents such as low-cost kerosene, Stoddard solvent, or light fuel oil distillate. Uses suggested by the Special Chemicals Division of Pennsylvania Salt Manufacturing Company, Philadelphia, Penna., the manufacturers, are—as an emulsifying solvent in removing carbonized oils, grease, smut, and drawing and buffing compositions. It finds use as a pre-cleaner, prior to electroplating, yielding a physically clean surface, and is also applicable to power washer and soak tank operations in water emulsion form or to increase the effectiveness of alkaline cleaners. The material also acts to inhibit rust formation. Packed in 55 gallon drums, it is available in commercial quantities.

SOLVENT EMULSION CLEANER PENNSALT E. C. #10

This solvent emulsion cleaner developed by Pennsylvania Salt Manufacturing Company combines soap emulsifying action with solvent penetration. Composed of emulsifying agents and suitable solvents, it is of the self-emulsifying, non-phenolic type. Suggested uses are for removing grease, oil, smut, and drawing and buffing compositions from metals and painted surfaces. Undiluted material may be applied cold by dipping, spraying, or brushing. It is also applicable to power washer cleaning in water emulsion form. Packed in 55 gallon drums, it is available in commercial quantities from Special Chemicals Division of Pennsylvania Salt Manufacturing Co., Philadelphia, Penna.

FLUOBORIC ACID (Pennsalt FA 42)

Fluoboric Acid HBF_4, is now offered by Special Chemicals Division of Pennsylvania Salt Manufacturing Company, Philadelphia, Penna., under trade name "Pennsalt FA 42" as a 42% solution containing a slight excess of boric acid for stabilization it is a clear colorless solution having a Sp. Gr. of 1.33. Known in the literature also as borofluoric acid and borohydrofluoric acid, its suggested uses are in the control of acidity in fluoborate electroplating baths, preparation of various metallic fluoborates, pickling agent and preparation of catalysts for esterification, polymerization, and condensation reactions. Available in commercial quantities, in glass carboys.

ROBERTS ROUGE ESTABLISH LABORATORY

The Roberts Rouge Co., Stratford, Conn., well-known manufacturers of Buffing Compositions, is pleased to announce to the trade that a physical and chemical laboratory has been established at the plant with modern and latest equipment installed. The laboratory will serve a two-fold purpose, first in the control of raw material purchased and second in development of new compounds and the control of manufacturing processes. While extreme care has always been exercised in the production of compounds this important feature will be stressed even more rigidly with the added technical control.

The laboratory will be under the

supervision of H. T. Leavenworth, metallurgist and industrial chemist, well known locally through his connection with Bridgeport Testing Laboratory which he established and operated successfully for a number of years.

The facilities of the new laboratory are freely extended to all customers of the company and it is sincerely hoped that they will avail themselves of this opportunity.

DIAMOND IMPREGNATED WHEELS

As the demand for Diamond Impregnated Metal-Bonded grinding wheels expands, the Larco Tool organization has noticed a marked increase in the number of questions received from every type of plant regarding these wheels. . . The requests for help and information have been so insistent, that Larco experts have compiled these questions and authoritative answers into a 32 page booklet. It is their opinion that this bulletin covers the most pertinent facts of Diamond Impregnated Grinding Wheels recommended uses, economical operation, proper maintenance, etc. . . . This booklet is available to plant executives and production men without charge. Write to Plant Service Department, Larco Tools, 551 Fifth Avenue, New York 17, New York.

WANTED

by Consulting Metallurgical Engineer, young man with experience in metal manufacturing or chemical engineering training. Work will comprise helping to write reports on chemical and metallurgical operations. Must have ability to write correctly and clearly, correlating field notes into readable reports. Attractive features of this opening are post-war continuation, growth with small but active firm, and interesting work. Give all facts in first letter. State salary. Completely confidential. Monthly Review.

NEW NON-ELECTRIC CLEANERS

A new group of metal cleaners has been made available to metal products manufacturers and electroplaters, by the Hanson-Van Winkle-Munning Co., Matawan, N. J. These cleaners have been designated as NL cleaners to distinguish them from the others made by the same company. They are not electric cleaners, but are designed for cleaning metals either by soaking, or in washing machines.

These cleaners are the result of studies in plants under practical operating conditions and have successful performance records in back of them. They do what is claimed for them.

Each cleaner is prepared in two forms so that it will give the quickest and best results when used in still tanks or in power washers and tumbling barrels. The present group of NL cleaners is as follows:

ALUMINUM AND MAGNESIUM CLEANERS

NL 1915 for Still Tanks and
NL 1915-P for Power Washers

These cleaners have been very successful for cleaning aluminum and magnesium. They are used largely as the cleaner before anodizing due to their speed, thoroughness and non-corrosive properties. One plant reports cleaning in 25% of time of next quickest material tried. Another plant reports allowing aluminum parts to remain in the cleaner for over ¼ hour without etching. Still another plant reports rapid removal of sprayed primer coats from aluminum, satisfactorily. The NL 1915-S is preferred for removing zinc chromate primer from aluminum.

CLEANERS FOR STEEL AND IRON

NL 1916 and NL 1916-P
(For Power Washers)

These are ferrous metal cleaners for still tanks and power washers, especially designed for rapid and thorough cleaning of steel shell cases. They are generally useful as a soak cleaner for steel, having a much longer life than the usual alkali soaks.

NL 1918 and NL 1918-P
(For Power Washers)

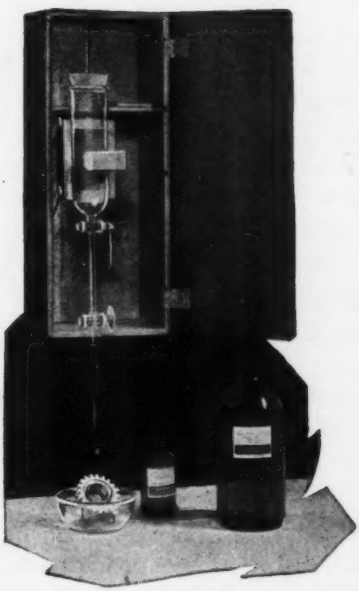
These are cleaners for steel prior to various Parkerizing operations. They are low free-alkali cleaners which clean thoroughly and lead to more uniform Parker coatings.

BRASS CLEANERS

NL 1917 and NL 1917-P
(For Power Washers)

ZINC THICKNESS

Test It Yourself



This set, using the Hull and Strausser method aids in determining the thickness of Zinc, Cadmium, Tin and Copper deposits.

We also make sets to aid in control of plating, anodizing, cleaning and pickling solutions.

SIMPLE TO OPERATE

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AMENDMENTS TO THE CONSTITUTION

(SPONSORED BY NEWARK)

Newark Branch feels that in as much as they have been instrumental in effecting a considerable saving in the cost of printing the *Monthly Review* that the Society as a whole should benefit by this saving they propose the following amendment to the By-Laws. The said saving will more than compensate the proposed reduction in the Per Capita Tax.

Proposed Amendment: Section 3 of Article VI of Part I of the By-Laws shall read as follows:

> Amount of Per Capita Tax: Each Branch Society shall contribute a Per Capita Tax of thirty-five per cent (35%) to defray the expenses of the Supreme Society, etc.

The only change in this By-Law is the percentage of the Per Capita Tax, which at the present time is forty-five (45%) per cent.

This is for the consideration of all Branches, so that the delegates to the National Convention may be properly instructed.

GEORGE WAGNER, *Secretary*

(SPONSORED BY MONTREAL BRANCH)

Preamble

AMENDMENT #1:

This Society shall be known as the International Society of Electroplaters and Associates Inc., and incorporated under the laws of the State of New Jersey.

AMENDMENT #2:

If Amendment #1 is not satisfactory we beg to offer for the following amendment — "That the Society be known as the Society of Electroplaters and Associates," and incorporated under the laws of the State of New Jersey.

AMENDMENT #3:

If this does not meet the approval of the delegates in session we beg to offer for your approval the following: "That this Society shall be known as the American Society of Electroplaters and Associates" and incorporated under the laws of the State of New Jersey.

AMENDMENT #4:

We suggest that the word "body" replace the word "society" wherever the words "Supreme Society" is used.

ARTICLE II — *Membership*

AMENDMENT #5:

Section 1: Change from two classes to three — Honorary, Active and Associate.

AMENDMENT #6:

Section 2: Active Members — Change to 3 members. These shall consist of two active and one associate in good standing from each Branch of the Society which is also in good standing, who have been elected to the supreme body in the manner required in the By-laws.

Each Supreme Officer now sitting must be returned as one of the Branch Delegates.

ARTICLE IV — *Officers*

AMENDMENT #7:

Section 2: Drop the word "active."

ARTICLE VI — *Charters*

AMENDMENT #8:

Section 3(c): Change to new name.

PART II — Branch Societies

ARTICLE I — *Name & Object*

AMENDMENT #9:

Section 1: Change name.

ARTICLE II — *Membership*

AMENDMENT #10:

Section 1: Change to read "three classes — Honorary, Active and Associate."

AMENDMENT #11:

Section 2: Change to read: "These shall consist of applicants who have had not less than five years experience in the process of Electrodeposition of any type of metal. Elected by a majority vote. Each applicant shall be required to furnish proof. He may also be required to pass such examination as may be deemed advisable by the Branch. Once elected as an active member he shall have the right to retain this classification as long as he maintains his membership. Any member who through the old ruling of the Constitution lost his active membership may apply to his Branch for re-instatement to this class if he so desires.

AMENDMENT #12:

Section 3 — *Associate Members*: These shall consist of any persons not qualified for Active membership who are engaged in any phase of the Electroplating or Electrofinishing Industry and interested in the aims and welfare of this Society, and elected by a majority vote. Associate members shall have all the rights of an active member but in

only so far that only one can be elected each year to represent his Branch as a delegate to the Annual Convention.

AMENDMENT #13:

Section 4 — Drop this paragraph.

ARTICLE III — *Officers*

AMENDMENT #14:

Section 1 — Add also a third Vice President.

BY-LAWS

ARTICLE II — *Duties of Officers*

AMENDMENT #15:

Section 3(a): There should also be a third Vice President.

SIXTH ANNUAL

★ NEW ENGLAND REGIONAL MEETING ★

New Haven — April 22, 1944

EDUCATIONAL SESSIONS:
2 P.M.
Strathcona Hall, Yale University
"Metal Situation" — Soderberg
"Finishing Aeronautical Equipment" — Promisel
"Regenerative Plating" — Diggin

CLINIC:
3:15 P.M.
Equipment Engineering
Theoretical Considerations
Practical Applications
Business and Government Administration
Aircraft Finishes and Specifications
Organic Coatings

WOMEN'S PROGRAM
2:30 P.M.
Shubert Theater
Matinee performance

BANQUET, DANCING, ENTERTAINMENT
7 P.M.
Ball Room, Hotel Taft
(Informal)
Tickets — $4.00 each

FIRST ANNUAL

JACKSON-LANSING MEETING

Jackson — May 13, 1944

EDUCATIONAL SESSION — 2 P. M. — HOTEL HAYES

"High Speed Copper Plating with New All Potassium Bath" and "Cadalyte Cadmium Plating Process for Cadmium Plating"—HOWARD H. BLOUCH.

"Heat Treatment of All Types of Metals and Discussion on Various Types Salt Baths"—DR. HAIG SOLAKAIN.

"Finishes for Aluminum"—RALPH E. PETTIT.

DR. R. E. SALTONSTALL—SESSION CHAIRMAN
DINNER 7 P.M. — TICKETS $2.50

Chairman Program and Educational Committee

THE ABSTRACT SECTION

MAURICE R. CALDWELL

Chairman Program and Educational Committee

Nickel-Plating. By V. K. GINDLIN. *Nauch. Zapiski Khar'kov Poligraficheskogo Inst.* **1939,** No. 3 243-56; *Khim. Referat. Zhur.* **4,** No. 3, 82 (1941); *Chem. Abstracts* **37,** 4307 (1943). Nickel baths are described. The preparation of pure $NiSO_4$ from technical double nickel salts is described in detail. Cu is removed by treatment with iron wire; then Fe is removed by oxidation with H_2O_2 and precipitation with 5% NaOH. Then $Ni(OH)_2$ is precipitated with 10% NaOH, carefully washed, and dissolved in 1:5 H_2SO_4. By the addition of ethyl alcohol, $NiSO_4$ is salted out, leaving Fe and Co salts in solution. Sn and Pb are objectionable impurities in nickel plating.

ERNEST H. LYONS, JR.

Antimony as Inhibitor in the Acid Pickling of Iron. By ROBERTO PIONTELLI. *Ricerca sci.* **13,** 139-40 (1942); *Chem. Abstracts* **37,** 4634 (1943). The inhibiting effect of antimony in HCl depends on its concentration: with sufficiently high concentrations there is complete protection with no visible separation of antimony; while at lower concentrations, iron is attacked more rapidly than when no antimony is used, and a spongy; incoherent deposit of antimony appears. The lower the concentration of HCl, the more antimony is required. The iron can be washed and remains inactive for some time when immersed in HCl containing no antimony. The film of antimony produces a surface of relatively high overvoltage which is responsible for the inhibiting effect. These observations agree with the general theory of processes of deposition: the formation of a compact, adherent, protective film is favored by high concentration of the deposited metal in the solution, and by increase in the degree of complexity of its ions.

ERNEST H. LYONS, JR.

Electrolytic Production of Silver-Lead Alloys for Bearings. By A. BEERWALD and L. DORNICKEL. *Z. Elektrochem.* **48,** 255-63 (1942); *Chem. Abstracts* **37,** 4633 (1943). The silver-lead alloy electrodeposition described by Faust and Thomas is a consequence of depolarizing of the lead deposit. Variations in the lead content of the deposit occurred even with constant operating conditions; the cathode potential fluctuated even with constant current, presumably because of poor reproducibility of stirring conditions, and the formation of polycyanides. If the equilibrium potential of lead was not reached, the lead content of the deposit depended exclusively on the dissociation potential and the lead concentration of the bath, and not on the current, cyanide concentration, or rate of stirring; thus the cathode potential as well as the current density must be controlled to produce deposits of constant composition. For the desired alloy with 3.5% lead, the bath recommended is: potassium tartrate 47 g./l., potassium cyanide 22, silver cyanide 30, potassium hydroxide 1, basic lead acetate 3. Alloys from this bath have an exceptionally fine-grained texture; X-ray studies show a definite expansion of the silver lattice. The alloys can be recrystallized without further modification, and retain a fine crystal texture.

ERNEST H. LYONS, JR.

Atmospheric Corrosion of Copper. A. W. TRACY, D. H. THOMPSON and JOHN R. FREEMAN, JR. *Proc. Am. Soc. Testing Materials*, No. **37**, 32 pp. preprint (1943).—It has been stated that the superior resistance of some older Cu roofs was due to impurities, more recent ones being made of Cu that was too pure. To study this possibility, 12 types of Cu, ranging in purity from 99.3555 to 99.9735%, were exposed for periods up to 10 years to marine, rural and industrial atmospheres, as well as in sea water. A complete analysis was made of each alloy. Corrosion was determined on sheet samples by changes in weight, tensile strength and elongation, and on wire samples by tensile strength, elongation, and on wire samples by tensile strength, elongation and electrical resistance. In rural atmospheres arsenic Cu was superior; in industrial and marine atmospheres high-purity electrolytic Cu and Wallaroo (0.25% Ni) are more resistant than the general av. The differences are small and probably would have little, if any, practical significance in normal service. The As-Cu types are significantly more resistant to clean sea water than the other Cu types tested.

F. W. FINK, *Chemical Abstracts*

The Behavior of Zinc Subjected to Atmospheric Conditions. EUGEN DEISS. *Wiss. Abhandl. deut. Materialprufungsanstalt* **2,** No. 2, 31-45 (1941); *Chem. Zentr.* **1942, I,** 1426-7.—In Zn sheets subjected to atmospheric conditions corrosion taking place in an industrial district is caused by the relatively high SO_2 content, which together with atmospheric O_2 attacks the metal, forming soluble sulfates, which are easily washed away. In nonindustrial districts, the corrosion is largely due to basic carbonates, which are less soluble, and afford protection against further corrosion. A number of specific atmospheric tests are described, with results obtained.

L. H. SEABRIGHT, *Chemical Abstracts*

Hard Chromium-Plating on Aluminum Alloys. ERNST RAUB. *Z. Metallkunde* **33,** 333-6 (1941); *Chem. Zentr.* **1942, I,** 1426.—The process of hard Cr-plating on Al and its alloys as protection from corrosion and to produce a hard wear-resisting surface has been quite successful. The Cr deposit must be thick enough to withstand any pressure to which the base metal may be subjected without crushing. Hard Cr on Al may cause galvanic corrosion, if the plated Al object comes in contact with salt solution and an organic acid (acetic, tartaric, lactic or citric acid). Oxalic acid attacks Cr plate. Most food acids can not develop contact corrosion, because of the presence of certain protein materials which act as inhibitors. An undercoat of Ni will improve corrosion-resistance. Hard Cr-plated Al work will stand changes of temperature without damage.

L. H. SEABRIGHT, *Chemical Abstracts*

Important Considerations in Chromium-Plating. WALTER ECKARDT. *Z. Metall- u. Schmuckwaren-Fabrik. sowie Verchrom.* **22,** 435 (1941); *Chem. Zentr.* **1942, I,** 1426.—The proper ratio of anode to cathode area in electrolytic Cr-plating is discussed and the effect of varying from this ratio. A short survey is given on the effect of foreign metals on the performance of the bath.

L. H. SEABRIGHT, *Chemical Abstracts*

Electrodeposition of Cadmium. VINCENZO SOLLAZZO. *Ann. chim. applicata.* **31,** 480-7 (1941); *Chem. Zentr.* **1942, I,** 1935.—Expts. with baths containing NaCN 120, Na_2SO_4 50, $NiSO_4.7H_2O$ 1.6, and CdO 25, 32 and 50 g./l., respectively, are described. The following bath was operated continuously for one yr. giving good deposits on a production basis: NaCN 60-80, NaOH 20-40, Cd 20-40 g./l., with sulfonated red oil added as a brightener. If the Cd content of the bath became too high, Fe sheets were used as auxiliary anodes.

LEOPOLD PESSEL, *Chemical Abstracts*

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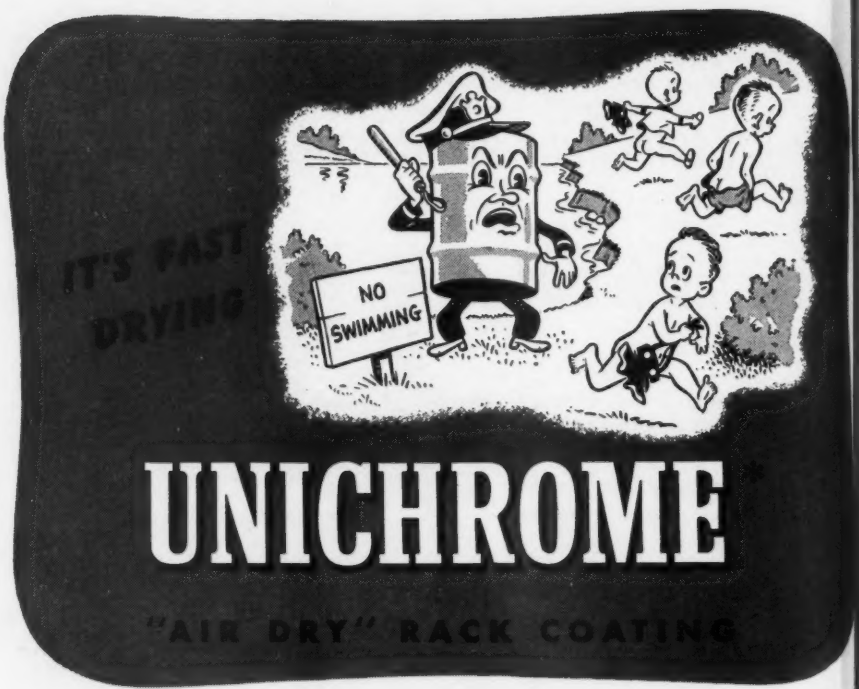

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BRANCH NEWS

Business and Social News • Educational Activities

SPRINGFIELD BRANCH

The December meeting of the Springfield Branch, American Electroplaters Society was held at the Hotel Charles on the 27th at 8:00 P.M. The meeting was called to order by President Plank. The minutes of the previous meeting were read and approved.

The following applications for associate membership were read, and the applicants were elected to membership in the Springfield Branch: Raymond J. DeGere, 1213 North St., Pittsfield, Mass., and Edward R. Ryan, State St., Richmond, Mass.

Mr. Frank Clark told the meeting that it was the custom at some of the local meetings for the members and guests to meet at dinner before the meeting convened. He added that some of the Springfield Branch members eat at the Hotel Charles before the meeting and suggested that more of the members try to join the group.

Mr. Samuel Paul, our oldest member and one who has been in the electroplating business most of his life, was persuaded to tell of a few of his experiences in the business before plating became a science. His stories were very interesting and enjoyed by the audience.

It was announced that the next speaker would be from the Bullard Dunn Division of the Bullard Dunn Co., Bridgeport, Conn. His talk will be on the Bullard Dunn method for the electrolytic scale removal.

Mr. Zavarella, Chairman of the membership committee was voted a $25.00 expense account with which to continue his membership drive.

Mr. Hanford then introduced the speakers of the evening: Mr. Arthur Zavarella and P. V. Romano of the Standards Laboratory of the Springfield Armory. Their subject was "Ordinance Finishes for Small Arms." The talk was well illustrated with samples of the finishes described. A lively and interesting period of questions and answers followed the talk, and they were given a rising vote of thanks.

D. S. HARTSHORN, JR.,
Sec'y-Treas.

The January meeting of the Springfield Branch, American Electroplaters Society was held on Monday, January 24th at the Hotel Charles, Springfield, Mass. at 8:00 P.M. In the absence of President Plank the meeting was called to order by Vice Pres. Zavarella. The minutes of the previous meeting were read and approved.

Applications for admission from Harry E. Crochon and John J. Rearden were read. Their names were placed on file.

Members and friends of Norman Plank were grieved to learn of the death of his mother. It was unanimously suggested that the Secretary send him a letter of condolence.

The Secretary gave a report on the progress of the coming regional convention to be held at the Hotel Taft in New Haven, Conn. on April 22nd. The Springfield Branch will handle publicity.

The Secretary announced that the copies of the Newark Year Book containing valuable tables and methods for analysis were sent free of charge by the Newark branch. Each member is entitled to a copy.

Various proposed subjects for the February meeting were discussed and it was decided to have the talk on the plating of plastics by Harold Narcus.

The Secretary then introduced Mr. Anthony Chenis, Engineer of The Bullard Dunn division of the Bullard Co., Bridgeport, Conn. He gave us an interesting talk on the Bullard Dunn electrolytic descaling process. The talk was well illustrated with samples of descaled steel. His talk was thoroughly enjoyed by all members and guests and

he was given a rising vote of thanks.

The meeting adjourned at 10:30 P.M.

D. S. HARTSHORN, JR., *Sec'y*

The February meeting of the Springfield Branch, American Electroplaters Society was held at the Hotel Charles on the 28th at 8:00 P.M. The meeting was called to order by President Plank. The minutes of the previous meeting were read and approved.

The secretary reported the progress which had been made at the last meeting of the New England Regional Convention committee. He said that the committee had made favorable progress and that the success of the convention was assured.

The following applications were read and the applicants were voted members of the Springfield Branch: John J. Rearden, Moore Drop Forging Co. and Harry E. Corchon, T. J. Murray Co. The following applications were read and placed on file until the next meeting: Mr. Howard Hindes, Washburn Co., Worcester, Mass. and W. J. Spence, Egyptian Lacquer Co., Springfield, Mass.

William Hanford, foreman of the plating department at General Electric Co., Pittsfield, Mass., announced that he had passed his physical and would be inducted into the Marines on the following day. We all wished him the best of luck.

President Plank appointed the following two nominating committees for 1944-1945 officers. He asked that these committees act independently of each other, and submit their slates at the May meeting. They are: Jack Costigan, Chairman, William Seidel and Emil Bonante. Harold Narcus, Chairman, Chester Klimek and Colin M. Hastie.

Frank Clark then introduced the speaker of the evening, Harold Narcus, Chief Chemist of the Plating Processes Co., Inc., Holyoke, Mass. The subject of his talk was Plastics and the Plating of Plastics. The talk was well illustrated with samples of plated plastics. Mr. Narcus explained the different types of plastics used in industry, their physical properties and general use and method of plating. He explained the different methods used to plate nonmetallics, and elaborated on the most popular method, that of metallic reduction. His talk was most interesting and instructive and represented a lot of time and study. He was given a rising vote of thanks and a hearty applause for the excellent paper.

The meeting adjourned at 10:30 P.M.

D. S. HARTSHORN, JR., *Sec'y*

BOSTON BRANCH

Librarians report of the Boston Branch Banquet, March 4th.

The educational session got under way at 2 P.M. with Pres. Smith extending a welcome to all present.

Bob then turned over the meeting to Bob Magnuson, our librarian, who had the pleasure of presiding at this meeting.

The first speaker of the afternoon was Mr. S. J. Colvin of the Parker Rust Proof Company and his topic was "Applications of Phosfate Coating." Mr. Colvin really put over his subject, answered numerous questions to the satisfaction of all and was given a rising vote of thanks for his fine paper.

Mr. John S. Hicok of the Promat Division of Poor and Company was the next speaker. The title of his talk being "The use of Alternating Current Superimposed upon Direct Current in the Electrodeposition of Metals." This subject was covered quite thoroughly and plated samples were shown which illustrated what could be done. The questions really started to fly and a lively discussion arose. Mr. Hicok was also given a rising vote of thanks for a swell paper.

At this point Doc Kellner from Waterbury spoke in regards to the coming New England Regional meeting to be held at New Haven, April 22nd.

Mr. Candee, the editor of the *Monthly Review*, also spoke and welcomed all to attend the National Convention at Cleveland in June.

The last speaker of the day was Mr. Robert Sizelove, Technical Director of the Frederick Gumm Chemical Co. His talk was on "Chemical Surface Treatment of Magnesium and Aluminum Alloys." It was a paper of very great value to those doing this type of work. At the conclusion of his talk, Mr. Sizelove was also given a rising vote of thanks.

A very pleasant surprise visitor to our gathering was Mr. George Wagner, the president of the Supreme Society. In behalf of the Supreme Society, he extended an invitation to all present to attend the National Convention at Cleveland in June.

BOB MAGNUSON, *Librarian*

PROVIDENCE-ATTLEBORO BRANCH

The regular meeting of the Branch was held on Monday evening, March 20, in the Providence Biltmore Hotel. After a dinner at 6:30 P.M., at which

several of the members and guests were present, the meeting was called to order at 8:30 P.M. by the president, John T. Henry, Jr.

During a brief business meeting, the president noted that the time for election of officers was approaching. He therefore appointed the following members to the nominating committee: James Potter, William Dwyer, and Thornton Woodwell.

President Henry then introduced the speaker of the evening, Mr. J. Frank Davis of A. Robinson and Son, New York. Mr. Davis spoke on "Gold Plating To Specifications."

After briefly summarizing the uses of gold plating in the war effort, Mr. Davis went on to describe in some detail the plating cycles for plating to a definite thickness or to a definite weight of gold. This can be done in barrels as well as in still tanks. Mr. Davis then went on to describe the tests which the gold plate must pass before being accepted by the armed forces.

Since this is what is known as the "Gold Branch," Mr. Davis' talk was followed with great interest by the members present, who braved the worst snowstorm of the year to hear the talk.

After a long question period, during which questions on coloring as well as plating were asked, Mr. Davis was extended a rising vote of thanks for his extremely interesting paper.

After a few closing remarks by President Henry, during which he expressed regret at the absence of our Secretary, Mr. Charles C. Chace, who is ill, the meeting was adjourned at 10:45 P.M.

ALFRED J. MARSHALL, *Librarian*

NEWARK BRANCH

The March 3rd meeting of Newark Branch AES was called to order at the Robert Treat Hotel in Newark, New Jersey, at 8:30 P.M. All officers were present.

The minutes of the previous meeting were approved as read.

The following Applications were voted to take the regular course:

Willard Hults—Associate

George H. Bronson—Associcate

Mr. Horace Smith and George Wagner reported on the Cleveland Banquet. Mr. Wagner reported that at the Executive Board Meeting in Cleveland it was decided that the local Convention Committee should handle the Convention Program direct. He further reported that the Convention Committee is making progress.

Under new business it was voted that Newark Branch send a check for $25.00 to the American Red Cross and the Secretary was authorized to do so.

Our Librarian, Ed Washburn, exhibited samples of magnesium castings which were dichromate treated. He informed us that the proper treatment for this method would be as follows: Magnesium castings should be treated prior to machining. By doing this it would eliminate spotting out and blotchy appearance of the surface. Mr. Washburn read part of a paper from the Illinois Water Treatment Company on the Illco Way process.

Mr. Washburn then conducted a question box which proved to be interesting and educational.

The meeting was adjourned at 11:00 P. M.

GEORGE WAGNER, *Secretary*

BUFFALO BRANCH

Our regular March meeting was called to order at 8:20 P.M. Friday evening, March 10th in parlor A of Hotel Statler. The roll call of officers showed all six officers and two board members present. One guest, Mr. Hyatt, of the Buffalo Electro-Chemical Company, was introduced by Mr. Ryan. The total attendace was 32.

The minutes of the February meeting were read, approved and placed on file. An application for membership was received from Charles Hoskins of the Carborundum Company. This application was passed by the Board members and sent through the regular channels.

The letter from Mr. Pinner, regarding the exhibits for the National Convention, was read and discussed. Dr. Wernlund proposed a motion that the President appoint a committee to arrange for the exhibits from the Buffalo Branch. This was seconded by Mr. Ryan and carried. Mr. Moneypenny was appointed Chairman and instructed to pick his co-workers.

Bills for the previous two months were read and ordered paid.

The party committee reported excellent progress in their arrangements for our party to be held April 22nd at the Markeen Hotel. A buffet supper and a dance will be provided for the small sum of two dollars and forty-five cents.

The tickets have been printed and are now on sale by Don Rice.

Under the heading of "New Business" we had a resolution proposed by Dr. Wernlund, "Whereas, one, Donald Hepburn has betrayed a trust, absocnded with property not rightfully his own and otherwise shown himself to be an undesirable individual, we of the Buffalo Branch do hereby resolve that the said Donald Hepburn is unqualified to remain a member of this organization, in consequence thereof he shall be placed on record as being expelled from membership in The American Electro-Platers' Society." This resolution was seconded by Bill Hart and passed unanimously.

President Logan appointed a nominating committee, Joe Ruff, Jim Moneypenny and Siebert Johnson to nominate a group of candidates for office for the coming year. The treasurer's bond was voted renewed on a motion by Don Rice. The treasurer's report was read, approved and placed on file.

Bill Hart suggested that sometime in the near future, our Branch should conduct a "Bull session" on Plating, to be accompanied by talks by several of our members who might have new processes or developments of interest to the members. This suggestion was turned over to our librarian, Bill Fotheringham, to be acted on and developed at his discretion.

After the business session, we were shown a motion picture supplied by the Office of War Information, and containing "shots" taken in actual combat.

The meeting was adjourned at 9:45 P.M.

JAMES C. MAYS, *Secretary*

PITTSBURGH BRANCH

The regular meeting of the Pittsburgh Branch was held 7:45 P.M., Thursday, March 2nd, at the Fort Pitt Hotel. The dinner preceding the meeting was attended by 23 persons and the meeting proper was attended by 31 members and friends. Our president, Mr. H. F. Saylor, presided over the meeting.

The minutes of the preceding meeting were read and approved. Mr. McKeon reported that he needs the cooperation of all members to put over the exhibit for the convention from the Pittsburgh Branch. Mr. Jersey reported that the membership committee is working on several possibilities for membership.

The April meeting will be Ladies Night. The newly formed Suppliers Club of Pittsburgh will serve cocktails at the beginning of the meeting to be held Thursday, April 13th. Dinner will be served at 6:30 P.M. and entertainment will be provided for the evening.

Mr. Timby of Jones and Laughlin Steel Corporation will present his paper on "Alkaline Tin Plating on Strip Steel" at our May meeting.

Mr. T. W. Aikenhead, President of Pittsburgh Range and Heater Company spoke on India. Mr. Aikenhead had spent three years in India and gave a very clear picture of the life and habits of the people in that country.

The meeting was adjourned at 10:00 P.M.

FRANK R. KELLER, *Sec.-Treas.*

WATERBURY BRANCH

Waterbury Branch held its monthly meeting Friday, March 10, 1944, at the Hotel Elton. At 6:30 P.M. the group assembled in the Colonial Room for dinner and promptly at 8:00 P.M. President Carl Kilborn opened the technical session.

Tony Maz briefly outlined the work done by our Branch in preparation for the Regional Meeting which is to be held at the Hotel Taft, April 22nd. The educational program, banquet and entertainment promise to be the best of any of these meetings and all members should make an effort to attend.

Announcement was made of the business meeting of the Branch, which this month will be held at the home of Ellsworth Candee in Watertown. The date is March 24th, and it is important for as many as possible to be present.

We were pleased to note among our visitors Henry Downs, Jr., from Montreal, and George Hogaboom. Mr. Hogaboom is scheduled to speak before the American Society for Metals March 16th at the Connecticut Light & Power Co. auditorium, Waterbury. His subject is "Modern Metal Finishing," and it is hoped the Waterbury Branch will be well represented at this meeting.

Our technical chairman Ellsworth Candee opened the program with two movie shorts, "Hunting Thrills" and "Putting on the Dog." These films were quite a change from what we have been used to, one showing the training and working of several breeds of hunt-

ing dogs, and the other the hunting of aligators, a sport which many of us wouldn't care to enjoy.

The book review was given by Jacob Hyner, and the book covered was the "Plastics Catalog for 1944." This gives a complete coverage of all commercial materials and methods and should be in the possession of anyone interested in the subject.

Bill Starr on priorities briefly reviewed the new order on Trichlorethylene and Perchlorethylene.

We all regretted that Carl Heussner was unable to be present to deliver his paper on "Electrodeposits as Engineering Materials," however Mr. E. T. Johnson, also from the Engineering Division of the Chrysler Corp., very ably took his place.

Ellsworth Candee in his introduction posed the question, "Where is plating going?" pointing out that in the last year or two great changes have been made in the requirements of electroplating, so today it is no longer a skill but rather an engineering science.

Mr. Johnson showed just what is being done today and pointed out some of the things to be expected of electroplating in the future. During its history, plating has progressed from a purely decorative coating to one of high finish plus corrosion resistance, and now to a covering for great corrosion resistance only.

Prior to the war, engineering uses concerned only chromium for building up heavy deposits and electroforming. Today electroplating is used primarily to conserve critical materials and this conservation has, in many cases, actually improved the product. Worn and undersized parts are being salvaged. Other parts are being made to function better through the plating of bearings and through the application of porous chromium to reduce friction. The electroplater is now even called upon to produce raw materials such as powdered metals having properties which can be produced in no other way.

Thus in this very carefully prepared paper Mr. Heussner and Mr. Johnson have shown us what is being accomplished today and what is expected of us tomorrow. At the conclusion, Mr. Johnson was given a rising vote of thanks.

Meeting adjourned at 10:45 P.M.

SPENCER L. HENN, *Secretary*

PHILADELPHIA BRANCH

President Verrell called the February 4th Friday meeting, of the Philadelphia Branch A.E.S., to order at 8:45 P.M.

Librarian Henry G. Orlik introduced the speaker, Mr. Ray C. Coates of the Standardizing Division of the R. C. A., Camden, N. J.

Mr. Coates gave quite a lengthy talk on how the Division reaches the accepted standard methods set up in the organic finishing of their materials; which include the scratch, abrasive, and bending tests for adhesion of the various organic materials used.

The speaker also cited the fact that the Standardizing Division correlates the purchasing of materials so that the number of same may be cut to the minimum.

Mr. Marcowitch of the same division, inorganic section, gave that section's method of standardizing; which includes visual, thickness, stain free, Magna gage, and the usual drop test, so familiar to the platers.

Mr. Coates and Mr. Marcowitch were given a rising vote of thanks after answering the many questions.

The minutes of the previous meeting were approved as read.

Wm. H. Moyer and Jos. Brosso, associates, after approval by the Board of Managers were elected to membership.

The Boston Branch's invitation to their banquet was received and noted.

The bills were ordered paid and the meeting adjourned at 10:45 P.M.

PAUL MENTZER, SR., *Secretary*

MILWAUKEE BRANCH

The Milwaukee Branch had a real turnout for its March 4th meeting at the Republican Hotel. Mr. Vincent Sheehan acted as Sergeant at Arms for the election of new members: Mr. Milton Johnson of A. O. Smith Corporation; Mr. A. Adelman of the Badger Plating Compand; Mr. Eugene Hess of Allis Chalmers Company, and Mr. Oscar Johnson of the Badger Plating Company.

Following the election of new members, the nominations for officers for the new year took place. Some of the nominations are: Mr. Robert Steuernagel, Jr., Mr. Vincent Sheehan, Mr. Harry Unke, and Mr. Henry Bornitzke for President; Mr. William Geissman, Mr. Vincent Sheehan, and Mr. Frank Marx for First Vice President; Mr. Robert Goodsell and Mr. Herbert Jaeger for Second Vice President; Mr. James Durnford and Mr. Jack Geissman for Secretary-Treasurer; Mr. William Geiss-

man for Librarian; and Mr. Robert Steuernagel Sr., Mr. William Lawrie, Jr., and Mr. Ray Goodsell for the Board of Managers.

Mr. Arthur Hoffman of the Egyptian Lacquer Company made application for membership as an associate.

After much ado about nothing at all, the meeting was turned over to Mr. William Geissman who introduced Mr. C. W. Smith, research chemist of the Detrex Corporation, who spoke on water emulsifiable solvent cleaning materials. He well covered the theory and application of the so-called emulsion type cleaners. His explanatory talk and colored slides proved very interesting and he was given a hearty round of applause. The meeting adjourned and the members gathered at the bar to find out about the wetting properties of good old Milwaukee beer.

JAMES DURNFORD, *Secretary*

CHICAGO BRANCH

The regular monthly meeting of Chicago branch was held Friday, March 10th, 1944 at the Atlantic Hotel.

President R. J. Hazucha presiding and all other Officers present. A letter from our 3rd Vice Pres. Mr. W. L. Pinner regarding exhibits for the Cleveland convention read and placed on file. Mr. G. S. Krentel was appointed Chairman of Chicago Branch exhibits and if any of our members have anything of general interest to exhibit please get in touch with Mr. Krentel, your co-operation will be appreciated.

Mr. R. Sturenagel, Jr., President of Milwaukee branch was a visitor at this meeting and invited Chicago branch members to the Milwaukee annual educational and banquet in April.

I am very sorry to report the death of Mr. J. P. Carlson, president of the Arrow Plating Co. Pete, as he was known to most of the members of Chicago branch, was a charter member of Chicago branch. Our deepest sympathy is extended to the family of Mr. Carlson.

Our Librarian, Mr. Krentel, introduced the guest speaker of the evening, Mr. M. B. Diggin, chief chemist of the Hanson-Van Winkel-Munning Co., who made a very interesting and instructive talk on "Lead Plating." Mr. Diggin answered many questions asked by those present, and passed out charts explaining cost and also the Salt Spray resistance of the various thickness of lead coatings.

The following questions were found in the question box:

#1. What dip method can be used to remove solder from brass and copper without affecting the metal.

Answer. It was suggested that a solution of 100 gr. per litre of 90% caustic soda and 10% sodium nitrite at 160% degree might do the job.

#2. Can carbon anodes be used in a nickel solution successfully?

Answer. One member stated that he tried carbon anodes but that it was not satisfactory for commercial use.

#3. Does air agitation work successfully in a nickel solution?

Answer. Yes.

#4. What causes poor throwing power in a lead solution.

Answer. Sometimes the base metal that you are plating, if it is flashed in copper the trouble may be overcome.

There were 60 in attendance at the meeting which adjourned at 10 P.M.

J. W. HANLON, *Secretary*

HARTFORD BRANCH

The Hartford Branch, American Electroplater's Society, held its February Technical Session at the Hotel Bond in Hartford, Conn.

Mr. Art Logozzo gave us a fine talk supplemented with many slides on Some Aspects and Applications of Hard Chrome Plating.

The fifty-six persons who attended this meeting certainly enjoyed one of "Art's" usually fine and thorough talks on Hard Chrome Plating.

Mr. George Hogaboom who has now transferred to the Hartford Branch is to present a talk at our next Educational Session to be held in February at the Stanley Golf Club, New Britain, Conn.

S. ZAVARELLA, *Sec'y-Treas.*

LANCASTER BRANCH

The Lancaster Branch of the A. E. S. met March 10 at Snyder's Plating Works in Harrisburg, Pa. There were 27 members and visitors present.

The chairman appointed the following nominating committee:

Mr. Norman Gebert, Chairman, Mr. Chris Brubaker, Mr. Rowlan Hoenstine.

This committee is to nominate men for the offices for our election in May.

The April meeting will be held in Lancaster. Mr. Sizelove will speak on "Electroplating with Superimposed Alternating Current."

Mr. Brubaker introduced Mr. LeRoy Critchfield the speaker of the evening. His subject was "Chromium Plating of Tools." Mr. Critchfield opened his talk

with a few introductory remarks as to the value of hard chromium plating in the war effort.

A brief description of hard chrome plate was given in which it was pointed out that the plate is applied directly to the base metal, uses, other properites than appearance, no special bath is needed, and there is no difference between it and a decorative plate.

The properties and advantages were listed as follows, etc., high hardness, ranging from 600 to 1025 Brinell, corrosion resistance, low coefficient of expansion and its non sticking properties. Mr. Critchfield stated that a knowledge of the base metal is important, because of difficulties encountered in cleaning. He outlined several simple methods for identifying the base metals. The speaker stated that the hardness of the base metal is important, also its finish and a knowledge whether there are stresses remaining after heat treatment.

The important considerations to be given work which is to be hard chrome plated are as follows: rack design, anode design and capacity, conductivity of rack material, cleaning, etching and finally plating.

Mr. Critchfield closed by listing the tichkness of deposit required on various types of tools, dies, gauges and other work.

After a brief period of questions the meeting was adjourned.

WILLIAM H. FORDNEY,
Secretary

NEWARK BRANCH

The regular meeting of Newark Branch, A.E.S., was called to order at 8:45 P.M. on Feb. 18, 1944, by President William Bruhns. In the absence of Mr. George Wagner, the Sergeant at Arms, John DeVries, was appointed temporary secretary. Mr. Wagner, as National President, was in attendance at the annual educational meeting and banquet of Cleveland Branch, and Mr. Horace Smith of our Board of Managers accompanied him. All other branch officers were present with the exception of Mr. Wm. Maguire of the Board of Managers.

Due to Mr. Wagner's absence, the ordinary orders of business were dispensed with and the meeting was shortly turned over to our librarian, Mr. Edward Washburn, who introduced as the speaker of the evening, Mr. Saltonstall of the Udylite Company. Mr. Saltonstall gave a very complete and interesting talk on zinc plating with special reference to zinc plating of steel cartridges and shells, covering the subject from the pre-cleaning and pickling stage to the final protective finish, and discussing the reasons for each step. After the talk there was a further discussion on the points brought out and then Mr. Saltonstall was given a rising vote of thanks by the 34 members present.

The meeting was adjourned at 10:25 P.M.

JOHN L. DEVRIES,
Secretary Pro-Tem

NEW HAVEN BRANCH

New Haven Branch held its monthly meeting on Feb. 1st, with a large number of members present. The session was called to order by our President Walter T. Lynch, who reversed the regular procedure of our business meeting first, foreseeing a lengthy discussion on our forthcoming Regional Convention.

The speaker of the evening, Mr. T. J. Colvin, Eastern Manager of the Parker Rust Proof Company, Detroit, Michigan, spoke on "Application of Phosphate Coatings." He presented a splendid talk, giving specific details and mechanics of phosphate coatings, depending upon the types of metals to be coated. He reminised upon many factual experiences, stimulating his talk by displaying various coatings and clarified many points regarding plated and painted finishes. Mr. Colvin was given a rising vote of thanks for his very interesting lecture.

President Lynch then opened the business meeting by informing the members of the convention committee, plans for its annual affair, and read the following names and branches chosen to head the various programs.

Chairmen: Joseph T. Sullivan, Henry L. Kellner
Secretary: Walter T. Lynch
Treasurer: Bernard J. Gaffney, all of New Haven Branch
Educational: Arthur McNeil, Bridgeport Branch
Publicity: John Costegan, Springfield Branch
Program: Anthony Maz, Waterbury Branch
Ticket: Kenneth Bellinger, Hartford Branch

The application from two new members, Mr. V. M. Caltham of Milford Rivet & Mach. Co., Milford, Conn., and Mr. N. G. Rivers of DeJur Amsco Co., Shelton, Conn., were accepted. The meeting adjourned at 11:15 P.M.

B. J. GAFFNEY, *Secretary*

PROVIDENCE-ATTLEBORO BRANCH

The regular meeting of the Branch was held January 17th, in the Providence Biltmore Hotel.

The usual dinner preceding the meeting which was held in the Town Room of the Hotel, at six-thirty, was well attended by several guests, and many Branch members.

Mr. J. T. Henry, President of the Branch called the Meeting to order at eight fifteen, and the roll call of Officers found but one absent.

Mr. Henry presented the Speaker of the evening, Mr. Henry Strow, Chief Chemist, MacDermid Incorporated, Waterbury, Conn.

Mr. Strow gave a most interesting and enlightening talk on POSTWAR cleaning, and in his usual pleasing manner, gave to his hearers much needed information, and helpful hints that will prove to be of value in the future.

Society members from Boston, Springfield, New York, and Waterbury Branches were present at this meeting, and at the suggestion of our Branch President, offered many plans that will be of value to our membership committee, and for the entertainment of the members after Speakers have finished with the main event.

Applications for membership are coming in from our hard working committee, our Librarian promises a continuance of the best in attractions, so things are looking well for Providence-Attleboro Branch. Watch us grow.

CHAS. C. CHACE, *Secretary*

DETROIT BRANCH

The regular monthly meeting was presided over by President J. E. Fritts, at the Hotel Statler on Feb. 4th, 1944.

After the approval of the minutes of the January meeting, the following were elected to membership:

Emil W. Archer, Robert J. Brink, Charles D. Gerard, Orval C. Haxter, Frank J. Justice, Eulice G. Jolliff, Elmer G. Lundberg, George Mahfouz, Ed. J. Nash, Clarence Rott, Harley O. Shultz, Earl W. Arnold, Rollie P. Durham, Wm. L. Grube, H. L. Jennings, M. E. Van Landegham, Clayton S. Menear, Louis J. Minbiole, Jr., Richard F. Rathburn, Ed. Sosnowski, Ludwik N. Witkowski.

The transfer of *Howard H. Bloch* from Cleveland was accepted and the transfer of Eugene P. Bottje from Grand Rapids, Michigan.

There were several applications for membership, and a letter from Mr. W. L. Pinner regarding the exhibits for our annual convention was read. A movie picture entitled "On to Jupiter" was shown and found to be an interesting preview of some of the post war products.

Mr. F. W. Hampson from Plating Process Corporation spoke on the subjects of "Effect of Current Density on Electro Deposits" and "Electronic Tank Control." His talk was accompanied by a demonstration of his electronic devices which evoked considerable interest and discussion among the ninety-five listeners.

F. L. CLITTON

GRAND RAPIDS BRANCH

The Grand Rapids Branch meeting was held February 11th at the Rowe Hotel. The attendance would approximate 60 members and friends. Starting promptly at eight o'clock, a variety program of new films were shown. These included champion fights of Joe Louis and other interesting movies.

Directly after the pictures the business meeting was conducted by our President, Homer Morton. Communications were read and placed on file. Reports of Committees were given.

Eight applications for membership were voted upon and elected. These were:

Charles H. Bommerscheim, Kalamazoo Stove and Furnace Co.
Wayne R. Fuller of the Grand Rapids Varnish Corp.
Jacob M. Hage of the W. B. Jarvis Co.
Philip A. Joyce of the Furniture City Plating Co.
L. C. Kroes of the Detroit Rex Corporation
Robert H. Lillyblad of the Camfield Mfg. Co., Grand Haven, Mich.
E. G. Prefontaine of the Du-Lite Chemical Corp., Middletown, Connecticut
John Wozniski of the Ford Motor Co.

One new application for membership was presented:

J. A. Roberts of the Cencast Corp., Grand Rapids.

The meeting was then turned over to our speaker, Mr. J. S. Hicok of the Promat Division of Poor and Company. His subject, "Use of Superimposed Alternating Currents in Electro-Plating Processes" proved to be interesting and

educational to all. Mr. Hicok was assisted by Chemist Dave Seymore who answered some of the technical questions. His talk covered the Promat Process electrolytes, a new development of Electro-plating materials, making possible advantageous use of super-imposed alternating current. The Promat Power Unit which he described opens up many possibilities of the use of abnormal wave forms in the plating field.

The Question Box was then conducted by our Librarian and a round table discussion took place with the speakers and members and friends in attendance.

Refreshments were then served by the Hotel and the meeting was adjourned.

A. E. ABEL, *Sec'y-Treas.*

NEWARK BRANCH

The regular meeting of the Newark Branch, A.E.S., was held on Friday evening, December 3rd, 1943. The meeting was called to order at 8:45 P.M. by President William Bruhns. Our secretary, Mr. George Wagner, was in Detroit attending a meeting of the Supreme Officers in his capacity of Supreme President, and Mr. John DeVries acted as Secretary for the evening. Because of Mr. Wagner's absence the reading of the minutes of the previous meeting were omitted and other normal items of business postponed until the next meeting.

Mr. Horace Smith reported the latest details on our Christmas party, to be held on December 18th, in the Robert Treat Hotel. All members and friends of the society are cordially invited to attend.

Mr. Royal Clark announced that he had immediate openings for positions for two electroplaters, should anyone be interested or know of anyone interested.

Mr. Smith brought up the subject of members of our branch who are now in service and the motion was made and passed unanimously that a Christmas present of ten dollars be sent each member of Newark Branch who is presently in active service. In addition to this Mr. Clark passed on a request for a Platers Guide book from Mr. John Miller, who is at present located in England. This was turned over to the secretary for action.

The meeting was then turned over to Mr. Louis Donroe, who acted as Librarian in the absence of Mr. Edward Washburn. Mr. Donroe conducted a very informative question box and quiz program until the adjournment of the meeting at 10:40 P.M.

JOHN L. DEVRIES,
Secretary, Pro-Tem

BRIDGEPORT BRANCH

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held Friday, Feb. 4, 1944 at the Hotel Barnum. President A. R. McNeil opened the meeting at 8:20 P.M. at our new location in the Barnum Hotel with 32 members present, including John English and Jack Buckman from the New Haven Branch as visitors. Also present were Messrs. Mitchell and Price from the Mitchell Bradford Chem. Co., Stratford, Conn. It was also nice to see Fred Duncombe present at the meeting.

The roll call of officers was read and Librarian John E. Charleson, B. F. Kusterer and Wm. Thompson were reported absent. The minutes of the previous meeting were read and accepted.

A special committee composed of Pres. A. R. McNeil and F. B. Gotthardt made a survey with the possibility of holding our future meetings at Barnum Hotel and gave us the following report. Business meeting 1st Friday of every month excluding July and August, the cost of room $5.00 and open session meeting room to cost $10.00. It is also possible to get refreshment service upon 30 minutes notice. Therefore, it was decided to hold our future meetings at the Barnum Hotel until further notice or otherwise decided by the members of the Branch.

F. B. Gotthardt, chairman of the Sick Committee reported one application and two members to be elected at this meeting. It is also gratifying to see the membership chart jump from the 10th position in December 1943 to the 3rd place in the February 1944 Review. Very good work, Hubert and the members of the Branch.

A. R. McNeil, member of the Technical Sessions Committee, reported arrangements made for an open meeting to be held Friday, Feb. 18th at 8:00 P.M. at the Barnum Hotel. The speaker of the evening will be Mr. Ted Wieczorek of the Pape-Electroplating Co., New Britain, Conn., who will speak on Iron Plating, its relation to the war effort and possible applications in the post war era.

A letter from B. J. Gaffney, Secretary-Treasurer of the New Haven Branch inviting representation of our Branch to

a meeting to be held Saturday, Jan. 22, 1944 at 2:00 P.M. in the Hotel Taft, New Haven, Conn., with the view of selecting a committee for the 6th Annual Regional New England Meeting to be held in New Haven this year.

A letter from W. L. Pinner, Supreme 3rd Vice President, wherein he asks for support from each Branch concerning exhibits and displays with a committee to be formed to act upon these exhibits to be presented at the convention in Cleveland in June, 1944.

A letter from the Boston Branch A.E.S. announcing their Annual Technical Session and Banquet, Saturday, March 4, 1944.

Application for Membership:

James McGrath, 557 Steamboat Road, Greenwich, Conn. Associate Member.

Balloting for Membership:

Dennison H. MacDonald, 79 Bridgeport Ave., Shelton, Conn., Associate Member.

Joseph A. Bonazzo, 1173 Noble Ave., Bridgeport, Conn., Associate Member.

Insurance for the 16 m.m. projector was considered completed as no additional parts requested in the letter from Harold J. Walsh, agent, were added other than so stated in the original application for insurance.

Mr. Prescott C. Albee, 107 Clinton Ave., Mineola, L. I., New York, suspended due to non-payment of dues.

The Bridgeport Branch has received the 1944 Year Books from the Newark Branch for which the members thank them very much.

The secretary has asked the members for the co-operation for the engraving of the First Prize for the Branch Exhibits which the Bridgeport Branch received at the Buffalo Convention in June, 1944.

A committee composed of R. J. O'Connor, C. C. Helmle and Floyd Erlenmeyer was appointed by President A. R. McNeil giving them power to loan out our projector to any member of the Bridgeport Branch providing any damage or loss of parts is made good by the borrower or borrowers.

R. J. O'Connor, A. R. McNeil and C. C. Helmle as representatives of the Bridgeport Branch attended a meeting Saturday, Jan. 22, 1944 at 2:00 P.M. at the Hotel Taft, New Haven, for the Sixth Annual Regional New England Convention to be held in New Haven this year. The following is a report of their meeting with more reports coming in later as progress is being made.

Taft Hotel—April 22, 1944—New Haven

Educational Session at Strathconan Hall—New Haven

Educational Program — Bridgeport Branch

Publicity—Springfield Branch

Tickets—Hartford Branch

Advertisement—Waterbury Branch

Program, Banquet & Entertainment—New Haven Branch.

We may mention that under New Business the Members of the Bridgeport Branch extend to John C. Oberender a Happy and Pleasant retirement from business after a long number of years in active duty in the metal finishing industry. We wish Mr. and Mrs. Oberender Good Luck and the Best of Wishes. And I might add, my friends, that being able to retire from business life is darn good new business.

In reference to the letter of W. L. Pinner, Chairman of Exhibit Committee asking for a Committee to be appointed Pres. A. R. McNeil appointed the following:

Exhibit Committee: Frank J. Kalafus, Chairman; F. B. Gotthardt, Stavin Pochna, Lawrence F. Griffin.

Bills against the Branch were ordered paid.

Good of the Order: No comments at this time.

The Treasurer's report was read and accepted.

Due to the absence of our Librarian, J. E. Charleson, Pres. A. R. McNeil turned the meeting over to our Old Timer and Past Master of Round Table Discussions and Bull Sessions, Ray J. O'Connor. The aftermath was a real bull session on the various problems of the Plating Industry which kept all of us to the keen point especially Gene Schimmel who has more questions than we have answers.

The meeting was adjourned at 10:45 P.M.

An open meeting was held Friday, Feb. 18, 1944, at 8:00 P.M. at the Barnum Hotel with 45 members and guests present. President A. R. McNeil opened the meeting and introduced Mr. Ovide Hogaboom of the New Britain Machine Co., New Britain, Conn., who spoke on Iron Plating, its relation to the war effort and possible applications in the post war era. Mr. Hogaboom has kindly consented to speak due to Mr. Ted Wieczorek who was scheduled to speak on this subject became ill

and was ordered by his doctor to remain in bed for a little time. Mr. Hogaboom possesses a thorough knowledge of Iron Plating, making some study on actual practice in the plating room. He has given us a complete history of Iron Plating and told us how best it could be used to a practical standpoint. Many questions were asked and Mr. Hogaboom certainly knew the answers. The meeting was enjoyed by all the people present.

Meeting adjourned at 11:15 P.M.

JOSEPH G. STERLING,
Sec'y & Treasurer

LOS ANGELES BRANCH

The monthly meeting of the Los Angeles Branch of the American Electro-Platers Society was held Monday, Feb. 14th, at the Rosslyn Hotel. Dinner was served at 6:30 to the 36 members and friends present.

In the absence of President Holman, who is East on business, First Vice President, Joseph Sunderhause called the meeting to order.

Stanley Rynkof, Sgt. at Arms, introduced the following visitors: Walter S. Cibulskis, United Chrome; Ted Cocoves and E. F. Sweinhart, Superior Electric; John Furost, American Surety Co.; Cpl. Robert D. Ohlhausen, U. S. Coast Artillery; A. G. Smidel, Electro-Plating Eng.

Meeting was turned over to Librarian, Earl Coffin, who introduced Mr. Earl Sweinhart of Superior Electric who gave a talk on Care and Maintenance of your Generator and Rectifier, Mr. John Furost of American Surety Co., whose talk was on State unemployment insurance and Federal social security. Both talks were interesting and brought out some points with which most of us were unfamiliar.

Marcus Rynkof was called to the telephone to receive a call from President Holman in Cincinnati, stating that he would be a little late getting to the meeting as it was snowing pretty hard and it would delay him.

Meeting was turned back to Vice President Sunderhause, who asked for applications, there being none, he invited all visitors to become members.

A five minute recess was called and visitors were dismissed.

Meeting was reopened. Applications of Harry James Delaney, Everett Thornton, Ray Lostutter, active, Dexter G. Halldin, Assoc. and Calvin V. Morris, reinstated, were voted on and accepted. Harry J. Delaney, Everett Thornton and Roy Lostutter, Jr. were initiated.

Minutes and financial reports were read and approved. Bills ordered paid. A letter was read by E. Wells from exhibit chairman of the National Convention to be held at Cleveland. A motion was made and carried that Mr. Wells investigate the possibilities of exhibits and report at the next meeting.

Mr. Rynkof reported that preparations were going ahead for the Annual Education Session and Dinner Dance to be held at the Los Angeles Breakfast Club, Sat., March the 18th, Educational Session, 10 A.M. to 4 P.M., dinner 7:30. All speakers have been retained. No further business. Meeting adjourned 10:30.

C. C. MCLAREN, *Sec.*

ROCHESTER BRANCH

The regular monthly meeting of the Rochester Branch was held Wednesday evening, February 9, 1944, at the Rochester Chamber of Commerce.

President John Q. Adams opened the session at 8:30. The minutes and treasury report of the previous meeting were read and approved.

In the absence of Mr. Tucker, our educational chairman, Mr. Henderschott, introduced the speakers for the evening: Mr. Conn and Mr. Erstrom of the Technical Processes. Their talk on Anodizing and Plating of Aluminum, proved very interesting. Questions were asked and answered during the demonstration, which consisted of a miniature anodizing unit with alternating current and a complete set-up for plating and soldering aluminum. If space is available, we will try to have their paper published in the "Review."

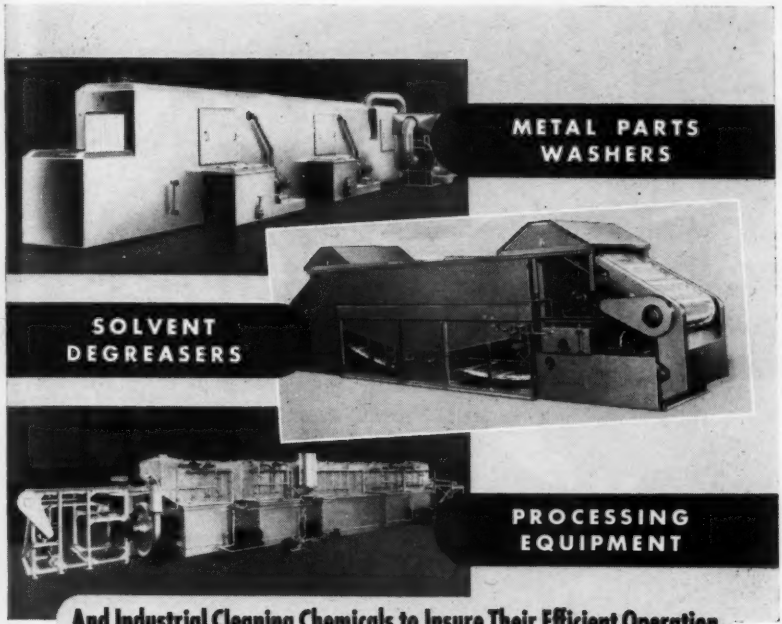
The meeting place of the Rochester Branch will be changed back to the Seneca Hotel, inasmuch as the Army has moved into larger quarters thus giving us access to our old headquarters. The meeting night will be changed to the second Friday of each month; starting with the meeting of April 14, 1944.

We, of the Rochester Branch, were honored by having guests from Buffalo, Toronto, and Tarrytown present at this meeting.

President John Q. Adams made an announcement of our Educational Session and Dinner Dance on March 11, 1944 and anyone interested is extended a cordial invitation.

The meeting was adjourned at 11:00 P.M.

DONALD C. BLUM, *Secretary*



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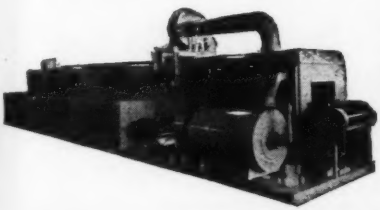

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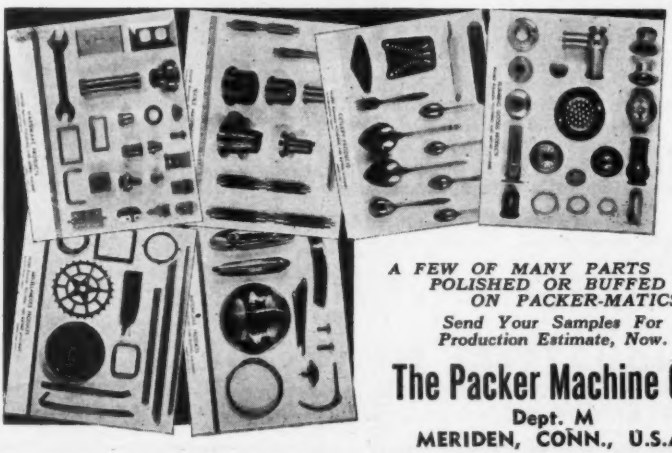

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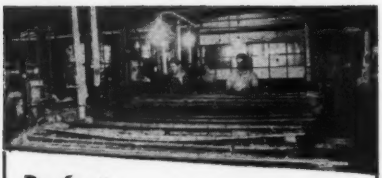

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BRANCH	May 1943	Change in Membership	Percent Change
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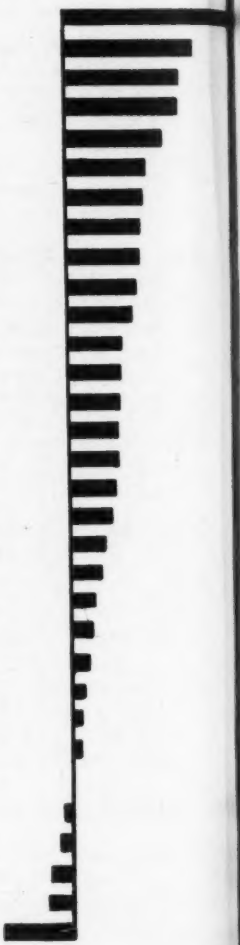
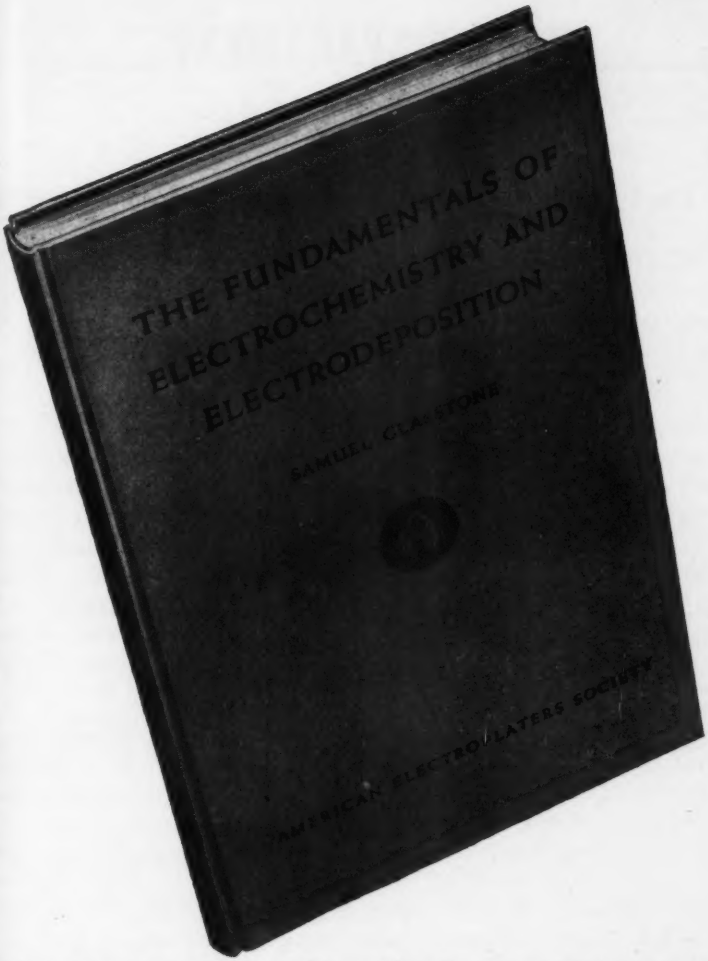
ST. LOUIS	77	+26	+33.7
BRIDGEPORT	78	+23	+29.4
BUFFALO	63	+18½	+29.3
GRAND RAPIDS	88	+22	+25
INDIANAPOLIS	60	+12½	+20.8
SAN FRANCISCO	33	+ 6½	+19.6
PITTSBURGH	55	+10½	+19
TOLEDO	37	+ 7	+18.9
DETROIT	280	+49½	+17.6
CINCINNATI	55	+ 9	+16.3
SPRINGFIELD	62	+ 8½	+13.7
CLEVELAND	104	+14	+13.4
CHICAGO	278	+37	+13.3
BOSTON	117	+15	+12.8
TORONTO	95	+12	+12.6
NEWARK	174	+20	+11.4
NEW YORK	139	+15	+10.7
PROV.-ATTLEBORO	54	+ 4½	+ 8.3
PHILADELPHIA	132	+10	+ 7.5
WATERBURY	105	+ 5½	+ 5.2
MONTREAL	50	+ 2½	+ 5
MILWAUKEE	93	+ 3½	+ 3.7
BALTIMORE-WASH.	98	+ 3	+ 3
DAYTON	96	+ 2	+ 2
LOS ANGELES	117	+ 2	+ 1.7
JACKSON	—	—	—
SYRACUSE	46	— 1	— 2.1
ROCHESTER	86	— 3	— 3.4
NEW HAVEN	103	— 7	— 6.7
LANCASTER	43	— 3	— 6.9
ANDERSON	30	— 5½	—18.3



MEMBERSHIP MAY 1, 1943	=	2920
MEMBERSHIP APRIL 1, 1944	=	3279
GAIN IN MEMBERSHIP	=	359
Per Cent of Gain 12.2%		



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BOOK REVIEWS

By

DR. GEORGE DUBPERNELL, *United Chromium, Inc.*

Principles and Applications of Electrochemistry. Volume II. Applications. W. A. Koehler. Second Edition, 573 pages. John Wiley & Sons, Incorporated, New York. 1944. Price $5.00.

This book is volume II or the practical part of Creighton's Electrochemistry, Volume I of which was reviewed in the December 1943 issue of the *Monthly Review*. The first edition of Volume II was published in 1935. Professor Koehler states that: "In this revised edition I have followed in the main the same general arrangement and grouping of topics as in the first edition. Considerable new material has been added, and some of the former material has been condensed and some omitted entirely. *** This book is based on notes and literature accumulated over a period of eighteen years of teaching the applications of electrochemistry; ***."

The chapter headings are the same as the first edition and run as follows: Economics of Power Generation, Review of Theoretical Electrochemistry, Primary Cells, Secondary Cells or Storage Batteries, Electroplating, Electroplating Solutions, Electrorefining of Metals, Electrometallurgy—Aqueous, Electrometallurgy-Fused, Electrolysis of Alkali Halides, Electrolytic Oxidation and Reduction, Hydrogen and Oxygen, Corrosion, Electroanalysis, Electric Furnaces (Three Chapters), Electronics, Ozone, Atmospheric Nitrogen Fixation, Separation by Electrical Means, Miscellaneous Electrochemical Processes, Author Index, Index of Subjects.

Chapter II, the "Review of Theoretical Electrochemistry" (pages 8-51) seems well written and a useful introduction to the subject. There are no problems at the end of chapters to aid the student. The book is descriptive in nature for the most part. The two chapters on Electroplating (pages 95-158) contain a surprising amount of material and working instructions and formulas are given for plating with each different metal. The description of plating equipment is good and much better illustrated than that of Blum and Hogaboom for example.

In order to examine the extent of revision the chapters on Electroplating were compared with those in the first edition and the following new material was noted: a short paragraph on rectifiers, revised data on materials for tanks, a full page description and illustration of a vapor degreaser, mention of bright plating and methods of determining throwing power, addition agents for acid copper, copper Rochelle cyanide solution, omits formula of copper oxalate solution, uses of cadmium plate, different cadmium formula, properties of chromium plate, new developments in iron plating, new lead fluoborate formula, new modified Watt's nickel

bath, rhodium plating, added data on silver, over two pages of new material on tin plating including a description of continuous steel strip plating, and revised data on zinc. While the above indicates considerable revision of the chapters on Electroplating, most of the added material is by reference to the corresponding chapters in the book on Modern Electroplating published in 1942 by the Electrochemical Society, and many important developments of the last ten years are not mentioned. Some added references are given to older work. Minor errors in references noted on page 113 were that the eighth edition of Langbein-Brannt was given the date of 1924 instead of 1920 and Metal Cleaning and Finishing was listed among periodicals even though it suspended publication with the November 1938 issue.

In addition to the two chapters discussed above there is also considerable information relating to electroplating in other chapters such as those on electrometallurgy, electrorefining, electroanalysis, miscellaneous process, etc. On the whole, the book is an excellent one which can be recommended. An effort has been made to bring it up to date and eliminate definitely obsolete or unimportant material. While this does not seem entirely successful it is a step in the right direction. Other new topics in the second edition mentioned on the cover are: Magnesium from Sea Water, Hydrogen Peroxide Manufacture, Fluorescent Lamps, Induction Heating of Non-Conducting Materials, New Carbon Bisulfide Furnace, New Phosphorus Furnace, and Nickel-Cadmium Alkaline Storage Battery. These further indicate the tremendous range of the book, which is customary in applied electrochemistry texts. The reviewer would eliminate most material on electric furnaces from such books as being a separate field, and condense other chapters into a single one on the electrochemistry of gases, but it is increasingly difficult to define the bounds of "electrochemistry" as time goes on.

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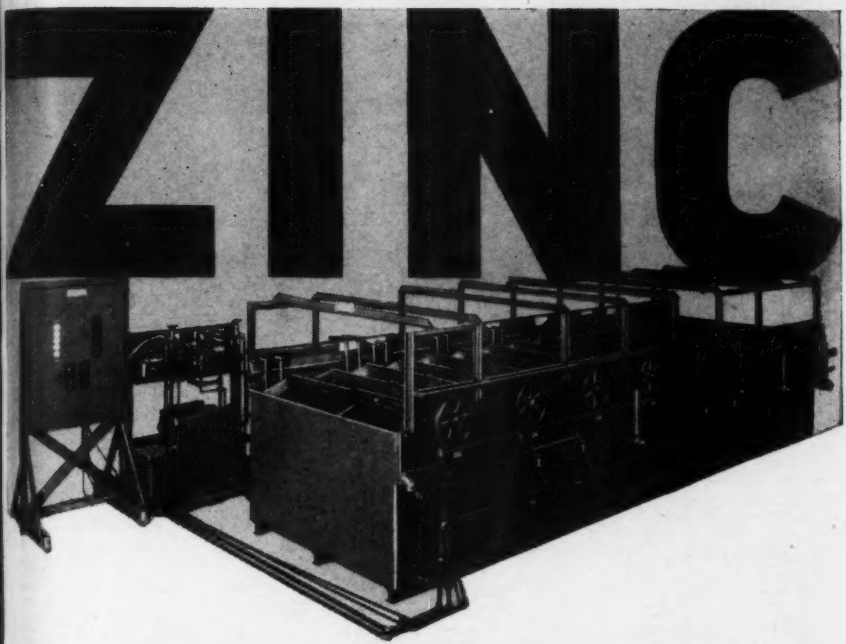

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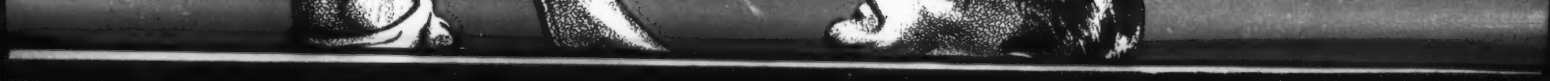

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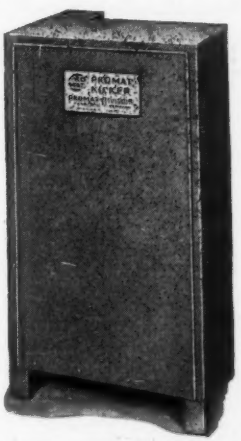

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